ARCHIVES OF OPHTHALMOLOGY.

TREATMENT OF GLAUCOMA WITH GLAUCOSAN, GLAUCOSAN DROPS, AND AMINE-GLAUCOSAN DROPS.

BY DR. CARL HAMBURGER, BERLIN.

(With three figures in the text and five on Text-Plate XXIX.)

IT was Paul Ehrlich who drew my attention to the fact that the theory on the nutrition of the eye, which was at that time universally accepted, could not be right. So I began my studies on that subject in 1897. My experiments confirmed Ehrlich's opinion as well as my own. The results of these studies were published in my book on the *Nutrition of the Eye.*[1] On the basis of my theories on the nutrition of the eye I have been trying to introduce the extract of the suprarenal gland, synthetic suprarenin SL of the Höchster Farbwerke, into the glaucoma treatment; I have been practising this method for three years, which consists in softening of the eyeball, with dilated pupil.

The starting point of my deductions was as follows: The basis of glaucoma must be a relaxation of the vasoconstricting mechanism, thereby causing a relaxation of the blood vessels and a consecutive repletion of the eye with blood. This action of course is most pronounced in the choroid. This membrane is built up on the plan of a corpus cavernosum and fixed in the walls of the eye like a water cushion. Per-

[1] *Über die Ernährung des Auges*, Thieme, Leipzig, 1914.

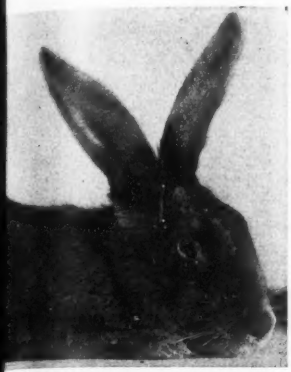
sons suffering from nævus vasculosus[1] of the face near the eyelids are frequently affected with glaucoma: this is always to be found on the same side of the face as the nævus. The following report of a case is of great interest from this point of view. Two ladies, the patient and her healthy sister, consulted Professor Hertel of Leipzig who found glaucoma and advised an operation. While he was speaking he noticed that the companion fell ill with glaucoma. A similar observation is reported by Professor Hegner of Lucerne. An elderly gentleman was called to the sickbed of his brother, whom he had not seen for ten years. Some hours later he got an attack of acute glaucoma, which soon passed after the use of eserin. Ten days later the gentleman again entered his brother's sickroom and this time he found him dying. At once he had a second attack and this time an operation had to be performed. Both these cases show the influence of the nervous system in the sense of a relaxation of the blood vessels.

The therapeutic use of suprarenin was a result of these reflections. After experimenting on animals I have applied it since February, 1923. The sympathetic nerve is irritated in the strongest way by subconjunctival injection up to 0.5*cc* of a solution of 1:1000. Clinical experience has justified our theoretical expectations. While in cases of acute glaucoma the effect of the treatment is still uncertain, I succeeded very well with cases of glaucoma simplex. Good vision and a good visual field could be preserved for years even where miotics had entirely lost their effect. It is of the greatest clinical value that after treatment with suprarenin, miotics frequently regain their full effect.

I reported my experiences in the following papers: "Experimentelle Glaucomtherapie" (*Med. Klinik*, 1923); "Neue Wege zur Behandlung des Glaucoms" (the same, 1924); "Zu der neuen Glaucombehandlung" (*Klin. Monatsblätter f. Augenheilkunde*, 1924); "Glaucom und allgemeine Medizin" (*Deutsche Mediz. Wochenschrift*, 1925), etc. Favorable results with this method of treatment were published by Römer and Krebs (*Z. f. Aug.*, 1924), Hagen (*Acta ophthalmologica*, 1925), Hegner (*Fortschritte der Therapie*, 1925) and

[1] *Klin. Monatsblätt. für Augenheilkunde*, 1924, p. 56.

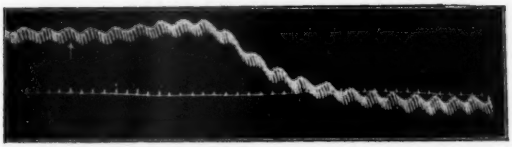
ILLUSTRATING DR. CARL HAMBURGER'S ARTICLE, "TREATMENT OF GLAUCOMA WITH GLAUCOSAN, GLAUCOSAN DROPS AND AMINE-GLAUCOSAN DROPS."



1. Rabbit's ears in normal straight position.

2. Elastic band applied to root of the right ear for several hours (copying Esmarch's elastic bandage). This results in violent inflammation; the whole ear is thick, hard and heavy (like the effect of suprarenin and glaucosan). In the eye an acute inflammation, as a rule, reduces the ocular tension as in iritis.

3. Two days later. The reaction has increased and the white of the ear has nearly disappeared.



4. Cat's eye (ether narcosis). 160 *mm* Hg measured in the carotid artery. One drop 10% solution put into the eye after 15 seconds (every interval between two points of the curve means one second), blood pressure fell from 160 to 120.

5. Control test. 1 drop aqua-dest. put into the same eye (the same animal). Blood pressure has increased again to 140; one drop of aqua-dest. produces no change in the blood pressure.

Report of the Transactions of the Ophthalmological Society, Vienna. It was there that Kafka on the basis of a large experience (39 cases) came to the following result: "The treatment of glaucoma with suprarenin seems to justify the hopes Dr. Hamburger put in it. It decreases the tension even for a longer period in cases where this had not been possible previously. By this means operations can be postponed and perhaps in some cases be dispensed with. Ophthalmoscopy was made possible in many cases by dilating the pupil without endangering the eye" (*Zeitschrift f. Augenheilkunde*, 1924). It stands to reason that in some cases the treatment will fail.

One great inconvenience, however, was a troublesome increase of the blood pressure, with the pulse up to 200 a minute and collapse, for suprarenin increases quickly the general blood pressure. To avoid these difficulties I looked for some substitute and in May, 1925, reported to the Medical Society in Berlin as follows: "As a rule lævogyrate suprarenin is used in medicine. My investigations showed that dextrogyrate suprarenin (as well as the inactive preceding stage of this preparation called methylaminoacetobrenzkatechin) possesses all of the good qualities of SL without any of the bad ones. They have a local constricting effect but without in any way affecting the blood pressure. The best effects were obtained with a combination of these two preparations, the former in a solution of 1:500, the latter in one of 1:100. This combined remedy is called glaukosan.[1] This preparation is injected subconjunctivally contrary to the much more concentrated 'Glaucosan drops' (see further on). It can be injected in very old people without causing any disturbance of the blood pressure."

Another great inconvenience was the necessity of subconjunctival injection. To obtain a remedy which can be used in the form of drops two things are necessary[2]: 1. A

[1] It is on sale at the Pharmazeutische Fabrik Wölm, Spangenberg near Cassell. "Ersatzpreparate für Suprarenin und ihre Bedeutung für die Glaucombehandlung," *Med. Klinik*, 1925, N. 40.

[2] This treatment has now been applied for more than a year. See "Glaucosan-Tropfen, Glaucoma simplex and Accommodation von Dr. Hamburger in Berlin," *Monatsbl. für Augenheilkunde*, March, 1926.

much higher concentration of the solution and 2. A return to the lævogyrate suprarenin salts, which are very much stronger.

I found that the blood pressure was not increased by the higher concentration to a dangerous degree. I treated about 50 patients with this remedy in the form of drops, and blood pressure was measured in six of these by two well-known internists. There was almost no rise; in some cases even a slight fall though the local effects were enormous: 1. The eye becomes marble white; 2. The opening of the lids is enlarged; 3. The pupil dilates sometimes quickly, at other times slowly; often at first excentrically; in recent iritis, synechia are torn. 4. The skin of the underlid often shows a pallor, sharply demarkated andrea ching down to the mouth. This shows how far the constriction of the vessels penetrated into the tissues. All this will pass off in a few hours. The following effects, however, will last much longer. 5. The softening of the eye with dilated pupil. This remains for several days. Sometimes it will produce a complete allergy, a complete change in the sense that miotics, which had grown useless, regain their full effect. I never noticed any poisonous effect. This is to be explained by the fact that a part of the solution is lost in dropping in, but chiefly because absorption takes place very slowly. It is of vital importance that the concentrated medicament, glaucosan drops, must never be injected.

Do not these strong solutions of salts harm the cornea? In my experiments on animals I used the dextrog. salts up to 33%, the lævog. up to 10%, that is 30 and 10 times the generally used solution (1:1000). I never noticed a lasting damage to the cornea, so the danger can by no means be a great one. However, it would be altogether unreasonable to apply such strong concentrations in the treatment of our patients. We attain our ends with safer and milder methods and in experimental therapy it is always safe to leave a broad intermediate stage between the beginning of the effect and the beginning of any danger. So neither I, nor those who were kind enough to help me in examining the patients' eyes, could find any serious damage done to the cornea. All the same I want to mention that in some cases there appeared a slight

glistening haze in the cornea only to be detected with a magnifying glass. Perhaps it consists in crystalline deposits, anyhow it disappeared in a few hours. The method is so safe that we apply it even to those with only one eye. I had it dropped in my own healthy eye six times and in the eye of the head nurse. No harm whatever was done.

"Glaucosan drops" consist of the suprarenin salt and the inactive preceding stage of this preparation known in scientific literature as laboratory number 23.[1] In the course of an hour the drops have to be repeated 4–5 times.

The technic of the instillation is of vital importance. The patient must lie down or bend his head far back. Two drops are put in the nasal corner of the closed eye. The oculist then carefully opens the lids. The eyes must be moved from side to side so that the drops get into close touch with every part of the eye for about 30 seconds. The usual way of simply putting the drops in is absolutely insufficient and renders the treatment completely worthless. The procedure has to be repeated from 4 to 5, in some cases only 3 times, at intervals of a quarter of an hour. So the whole treatment will occupy about an hour. The effect will last for several days, sometimes even for weeks.[2] As the effect will last for some days and concentrated suprarenin solution easily disintegrates in contact with the air, it is put out only in small quantities in tubes containing enough for one treatment like the vaccine tubes. Before putting the drops in, the ends have to be broken off and the rubber cap put on the top. Some patients feel when the tension increases and then beg for another treatment with the drops. Many of them prefer this procedure to miotics as the glaucosan drops do not take away the light so much. The effect must always be controlled with the tono-

[1] "Erfahrungen mit Hamburgers Laboratoriums number 23." *Klin. Mbl. f. Augenheilkunde*, 1924, volume 73, page 511. Braun, *Elschnig Klinik-Prag.*

[2] This preparation is on sale at the Pharmazeutische Fabrik M. Wölm, Spangenberg near Cassell, and is called "Glaucosan-Augen tropfen" (or Glaucosan-sinistrum). The shape of the ampules as well as the manner of packing make it impossible to mistake the drops for the injection. To make it even surer besides the name "Glaucosantropfen" (or "L—Glaucosan," turning the optical axis to the left) the prescription "only to be dropped in" is labelled on each bottle.

meter. The indications for the use of these drops are as follows: As long as miotics are successful nothing else ought to be given. When, however, they are not sufficient and whenever they produce the well known and painful catarrh the use of glaucosan drops is indicated. In some cases it seems advisable to apply these drops for about 8 or 10 days, then use again miotics for the same period and so on in turn. Glaucoma simplex never ought to be operated on before the effect of the drops has been tried, especially if the afflicted eye is the only one left or when operations have already been performed without lasting result. This remedy is of great importance where there is iritis with increase of tension, as the diagnosis between iritis and glaucoma is uncertain, for this mydriatic lowers the tension. Of especial interest is the range of accommodation. With older persons it is generally lowered by one or two dioptries; with younger ones, however, it remains undisturbed and the smallest type is read with dilated pupils. Why has suprarenin, known as so very transitory in its action, lasting effects when applied to the eye? It must be remembered that the effect remains unaltered for days and even for weeks. The first effect is to press the blood out of the uvea. This anæmia is succeeded by a strong arterial hyperemia, exactly as in the case of Esmarch's anæmia. If you leave Esmarch's elastic bandage in its place for a few hours it is followed by an enormous arterial hyperemia, which is apt to increase to the stage of violent inflammation. (See Fig. 1, Text-Plate XXIX.) At first both ears of the rabbit stay upright. Then one ear is made anæmic by an elastic bandage for twelve hours. A violent inflammation follows. The ear grows so thick and heavy that it hangs down. Similar are the actions in the eye: arterial inflammatory hyperemia, but this inflammation leads to the softening of the organ. It has long been a well known and very interesting fact that iritic or cyclitic eyes are softer than normal (as a rule). This is the paramount principle in the treatment of glaucoma[1] by softening the eye. A change for the better will set in as soon as we succeed in turning the venous hyperemia into an arterial one. An important part in this reaction is played by the vitreous (Martin H. Fischer,

[1] Hamburger, "Das Erweichungsprincip in der Glaucom-Behandlung," *Deutsche med. Wochenschr.*, No. 3, 1926.

Cincinnati). It is on this principle that all the different operations are founded.

Up to now we have had to operate whenever miotics failed. Successful as the operation may be in cases of acute glaucoma,

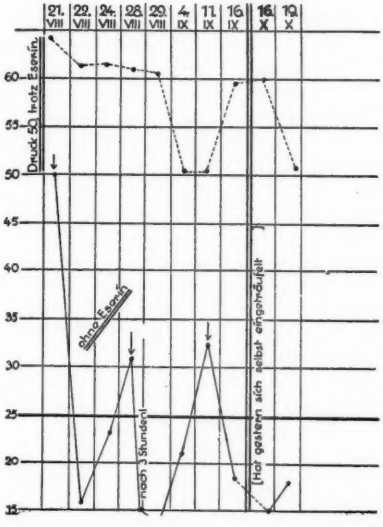


FIG. 2.—Patient, aged 50; glaucoma simplex for 4 years. The right eye (broken line) has been operated upon three times and is now lost. The left eye (unbroken line) was operated on once with transitory effect. On August 21, 25 L. tension was 50 in spite of drops. Glaucosan drops reduced the tension to 15 for one week. On August 28 T. was 31; another glaucosan drop instilled. After 3 hours T. down to 15 (pupil fully dilated). This treatment repeated at intervals. Eserin has regained its effect. Sight and field unchanged.

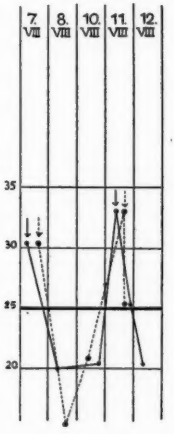


FIG. 3.—C. N. aged 74; glaucoma simplex; left eye lost without treatment; right eye (broken line in chart) treated with eserin for 2 years then, as this failed with glaucosan injections. During last six months glaucosan drops. The curve shows the result which remains for several days. Sight and field unchanged. Eserin now again effective.

as a rule the result is uncertain in chronic cases which are so much more frequent. This fact accounts, too, for the great number of operative methods (about 30). In all ranges of medical science acute diseases are easier to be healed than chronic ones. My experience is confirmed by Meller (Vienna), author of the well known manual, *Augenärztliche Operationen.*

"Generally only acute inflammatory glaucoma operations are known to give good prognosis. With all chronic cases, however, we have to be extremely careful in our prognosis. The more operations we perform, the more surprises we live to see and the more we shall be careful in our predictions."[1]

Conservative methods seem especially to be indicated, when one eye already has been lost or when operations have been done with only transient results, or when the scotoma reaches the fixation point.

In many cases I have succeeded in preserving for years good sight and a good field of vision by using alternately miotics and glaucosan drops. This requires, of course, a great deal of trouble which, however, it is worth while to take in the patient's interest. I refer to a paper by Jaensch, of the University Eye Clinic, Breslau.[2] His conclusions are: "Dextrogyrate glaucosan and glaucosan drops were applied in 13 patients, 5 cases of glaucoma, 8 of iritis with increase of tension. In cases where glaucosan takes no effect operations obtain no good effect either. Extremely good results are obtained in cases of low grade uveitis and iritis serosa: tension decreases and miotics previously ineffective regain their full influence on the eye. So glaucosan is a remedy at least equal in value to all the other usual medicaments and superior as far as it renders the application of miotics possible."

In cases of acute glaucoma glaucosan seems to fail. There were some favorable cases reported but after my own experience I believe the effect uncertain. Thus in such cases operations are indicated, whenever miotics do not cause rapid improvement. Perhaps in some cases of acute glaucoma operations may be dispensed with by employing miotics as follows: biogene amine, its chemical name being "B-Imidazolyl-æthylamin,"[3] contained in secale cornutum.

One single drop of a strong enough solution will be sufficient to narrow the pupil which had previously been maxi-

[1] Meller, *Kl. Mbl. f. Aug.*, vol. 73, p. 512, Aug., 1924.

[2] *Klin. Monatsbl. f. Augenheilk*, March 26, p. 433.

[3] A. Krogh, *Anat. and Physiol. of Capill.*, New Haven, Yale University, London, Milford, 1922, p. 105, and Guggenheim, *Biogene Amine*, Springer, Berlin, 1924, p. 215, etc. And Dale, *Journal of Physiology*, 1910, vol. 41, p. 318.

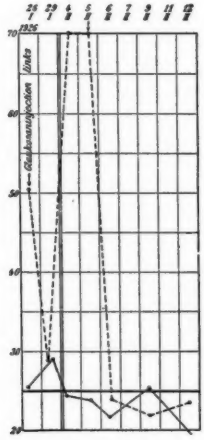
mally dilated by atropin or even by scopolamin or glaucosan. The effect is so striking that the pupil grows quite narrow. At the same time the conjunctiva, the lids and the face get flushed. The miosis remains for a few hours, the inflammatory process of the conjunctiva disappears more quickly. Thus amine is enormously superior to all other miotics. I call it "amine-glaucosan" (AG). It must, however, be employed with caution, as it lowers the blood pressure. That is why its use had to be given up in general therapeutics (obstetrics). Given conjunctivally even 0.005*g* causes a strong effect. At first I used subconjunctival injections (1.1000) 0.0002 = 2*m*. This treatment is effective as well as harmless but very painful for the patient, so I had much stronger solutions made to use in the shape of drops. Anæsthesia is to be induced before putting in the drops and the treatment can thus be repeated conveniently and painlessly.

In my experiments on cats' and rabbits' eyes I advanced to solutions of 40% strength; with my patients, however, only to 10% solutions. With many patients a solution of 5% or even 2% is effective, but you cannot rely on these weaker solutions while the 10% one is quite certain to obtain results. The treatment has always to be preceded by a test when the pupils are dilated by atropin or scopolamin. Never give more than one drop.

There are two problems to be cleared up:

A.—Do these high concentrations (10%) lower the blood pressure or harm the general health in any other way? When a cat is given a subcutaneous injection of 0.005*g* AG the blood pressure will sink from 160 to 40—to a dangerous degree. (One drop of the 10% solution contains 0.005*g* of the substance.) Given the same quantity dropped into the cat's eye (conjunctiva) the blood pressure sinks only from 160 to 120—thus hardly at all. (Figures 4 and 5, Text-Plate XXIX.) Measuring my patient's blood pressure the lowering proved to be even smaller, that is from 120 to 108 or 110 to 105. In some cases there was no influence at all on the blood pressure to be noticed. This is in accordance with clinical experience. I employed the remedy even with patients 80 years of age, as well as with patients suffering from heart disease, without any damage. I take, however, the following precautions: 1. I make the

patient lie down while the drops are put in; 2. Twice before the treatment I put in holocain; 3. I tell the patient beforehand that he will feel some aching and smarting of the eyes



CURVE 4.—Patient aged 66; glaucoma simplex for six years, controlled by usual remedies until January 26. T. reduced by glaucosan injection without disturbance of compensation. Another and severe attack on February 4, with opaque cornea, vomiting, etc. One drop of a 10% solution AG instilled and repeated in a few hours. T. fell from 70 to 24. Though patient suffers from heart disease no harm from the remedy.

and that the lids will swell (for ½ to 1 hour); 4. Never put more than one drop in the eye. The oculist holds the lids separated with his fingers for half a minute while the patient moves his eyes about. The drop must be well absorbed; without this there will be no effect. If the medicament is not carefully applied, the atropin pupil will not contract.

Sometimes from tears the drop will be washed out. In these cases there is no objection to repeating the treatment after 20 to 30 minutes. It has been evident that with these precautions no harm is done to the general health.

B.—Do the drops harm the eye? Serious damage has not been done to the rabbit's eye, though the solution was 40%. Thus the patient's eyes treated with only a 10% solution suffer not at all. Never were the deeper seated organs affected—neither iris nor retina. On the contrary, the strong arterial hyperemia and the impregnation of the cornea with serum will take a very favorable effect, similar to dionin, but incomparably stronger.

Which are the therapeutic consequences of these facts? In chronic cases the effect in my opinion is too transitory. But as in cases of acute glaucoma everything depends on contracting the inflexible pupil and keeping it contracted for some days, I expect good results from a miotic of such incomparable strength even where all others fail; of course, not in all cases, but in a good many. Though my observations are not complete the results are very encouraging.

I report three cases:

1. Workman, aged 25, perforating injury of the eye, extraction by electro magnet, traumatic cataract, secondary glaucoma. Tension 70. Cured by AG. Two years have passed. (I wish to thank Dr. Fehr, Virchow Krankenhaus, Berlin, for this report.)

2. Male patient, aged 66, glaucoma simplex for six years; kept stationary by the usual treatment; very good field of vision, sight $= \frac{5}{15}$ both eyes. Periodically great increase of tension—for instance 26.1.26 (51) but without disturbance of compensation; cornea clear, general health good. The high point of the curve going down at once after use of glaucosan, 29.1; but a week later in the early morning of the 4th of February severe acute attack of glaucoma; cornea opaque, vomiting, tension 70, though eserin had been put in the previous night. There was no time to be lost in using eserin. AG was dropped in after holocain, the patient lying down. Chemosis moderate. An hour later, cornea clear, pupil contracted. A few hours later a second, then a third drop of AG. After 24 hours: tension 24 (see curve 4). This has remained stationary for four months.

Sight on the day following the attack counting fingers, a week later $\frac{5}{15}$. Of course, the acute attack only is cured, not the disposition to glaucoma.

3. E., aged 52, glaucoma simplex for seven years. Four times operated upon by a reliable surgeon; technically perfect result. One eye almost blind; tension 50; the other eye S = $\frac{1}{10}$; field of vision very small. Into the worse eye glaucosan drops were put 4 times in the course of an hour, after cocain. (This, perhaps, was a mistake. Holocain is better.) Two hours later acute attack. After treatment with glaucosan drops such attacks are very rare, even more so than after injections with glaucosan. All such attacks I saw passed off without an operation—dangerous as they would sometimes look. At any rate, it is very convenient to counteract these attacks by amine-glaucosan; this remedy will favorably influence the attacks sometimes caused by the use of atropin or homatropin given to elderly people. At three o'clock, cornea opaque, headaches, etc. Therefore, eserin from 3 to 6 o'clock without any result. At six o'clock, AG one drop (after holocain). Chemosis very strong; cornea almost covered. After 30 minutes, cornea visible again and quite clear. The attack passes. According to my experience the attack probably would have passed during the night without treatment, but the quick result of AG was evident.

Conclusions.—Amine-glaucosan[1] is by far the strongest miotic known at this time. Therefore, it ought to be tried in cases of acute glaucoma, before an operation is done. The cases must, however, be carefully chosen. In cases of "absolute glaucoma" and glaucoma caused by tumor or of thrombosis of a vein in very old people no result is to be expected. But making the right selection, however, in certain—not in all—cases the technically so difficult operation may be dispensed with.

[1] Amine-glaucosan is produced by the same firm as glaucosan: Chemische Fabrik Wölm, Spangenberg near Cassel (Germany).

A SIMPLIFIED TANGENT SCREEN WITH SUGGESTIONS ON FIELD TAKING.[1]

By Dr. A. H. THOMASSON, New York.

(With three illustrations on Text-Plates XXX–XXXII, and five in the text.)

AS is well known Bjerrum's original screen was a simple black curtain 2 M square hung on a frame. There was on this screen no chart or drawing of any kind to enable him to estimate quickly the exact size and position of a scotoma. These estimations were made by means of a tangent ruler. Bjerrum's screen did not lend itself to rapid and accurate work, and the many attempts to improve upon it have been efforts to correct these faults. Probably the two most important modifications of Bjerrum's screen are those of Duane and Elliott. Duane's screen was described by him in 1906 and again in 1914. It was very similar to the screen then in use by Sinclair and Sym. This screen was a decided improvement over Bjerrum's because it had on its back a chart for the accurate measurement of scotomata, and did much in the way of advancing the study of scotometry in America, but it has been found to possess certain disadvantages, chief of which are:

1. It is too large and unwieldy to adapt itself to the average office, and its vertical adjustment is not easy.

2. It hangs so loosely that it is difficult to insert pins into it, and in inserting them it moves so freely that its distance from the patient is constantly varying.

3. The chart on the back of the screen and the corresponding field chart being made up chiefly of small squares have

[1] By invitation, Ophth. Sect. N. Y. Academy of Medicine, Mar. 15, 1926.

such a sameness, such a lack of distinct landmarks, that it is difficult to quickly transfer the scotoma from the screen to the field chart.

4. The field chart is also so unlike the field charts to which we have been accustomed that we do not readily form a mental picture of the position in the eye of lesions outlined on the chart.

5. It is too expensive.

Elliott's screen has the following important disadvantages:

1. It is constructed to carry out the circular method of field-taking suggested by Priestly Smith, and from its construction the movements of the test object are fixed, as in a groove, always in the same direction. For this reason the operator cannot vary his methods at will but must devote almost as much time to unimportant as to important field areas.

2. Since the screen itself must make a complete revolution for each degree of field investigated from 1° to 26°, the test object being moved out 1 degree after each revolution, for economy of time and to save the patient from fatigue the screen must be moved too rapidly to easily detect small or indistinct scotomata.

3. The resulting figure produced by this screen is not a true representation of the actual scotoma as depicted by other accurate and reliable methods.

4. This screen requires two people to operate it.

5. It is too expensive.

The screen which I shall offer has been used by me for the past five years with entire satisfaction, and I feel that it is free from these special objections. (Figures 1, 2, 3, Text-Plates XXX–XXXII.)

1. It is small enough to be assigned a place in any office. It may be moved easily from place to place, or be placed in a closet.

2. The screen is stretched tightly so that pins are easily inserted and cause very little vibration.

3. The chart on the back conforms to the field chart to which we are accustomed and yet there are definite landmarks, and the field charts are drawn according to the anatomic method, both of which make transfers to charts easy.

ILLUSTRATING DR. A. H. THOMASSON'S ARTICLE ON "A SIMPLIFIED TANGENT SCREEN WITH SUGGESTIONS ON FIELD TAKING."

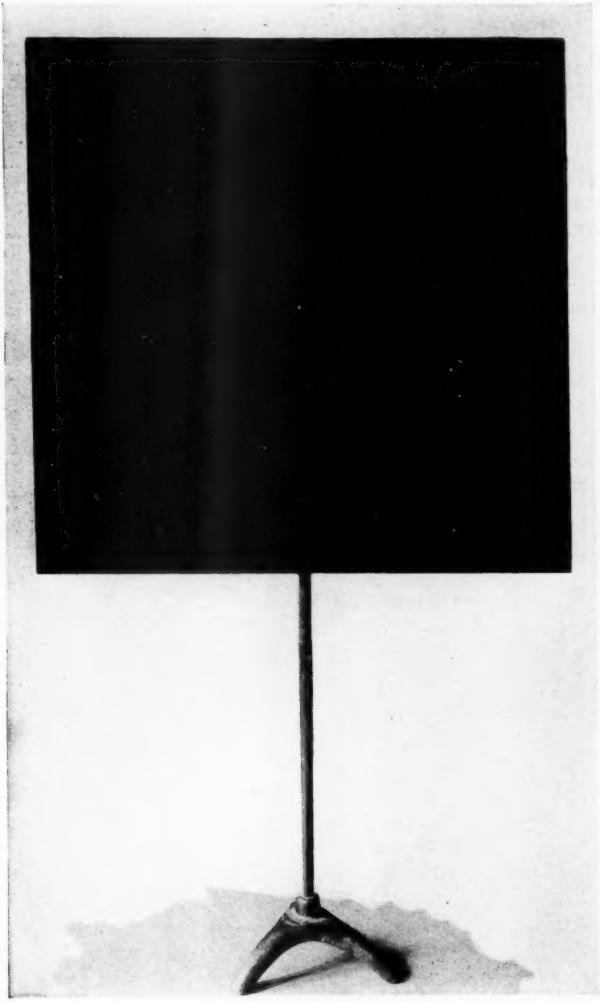


FIG. 1. Front view of screen.

ILLUSTRATING DR. A. H. THOMASSON'S ARTICLE ON "A SIMPLIFIED TANGENT SCREEN WITH SUGGESTIONS ON FIELD TAKING."

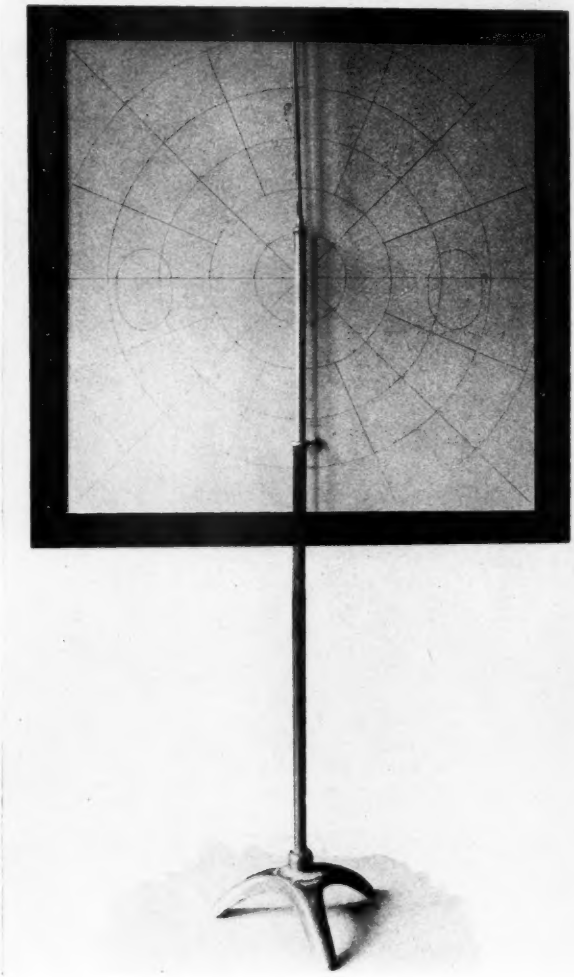


FIG. 2. Back view of screen.

ILLUSTRATING DR. A. H. THOMASSON'S ARTICLE ON "A SIMPLIFIED TANGENT SCREEN WITH SUGGESTIONS ON FIELD TAKING."

FIG. 3. The author's office arrangement of screen, head rest and light.

4. It is inexpensive and easily constructed.

Since the advantages of the tangent screen and the reason for using small test objects at a distance of 1M or more were fully explained by Bjerrum in his original paper, and by his followers, there would seem to be little excuse for offering a defense of this method if there did not appear to be a growing tendency in America to use short radius instruments with comparatively large objects in preference to the tangent screen. Because of this tendency I will here briefly compare the merits of these two types of instruments.

It is well known that the smallest object that can be just clearly perceived at the macula in the normal eye, cannot be seen at the periphery, and that as we pass from the point of fixation to the extreme periphery, larger and larger objects must be used in order to render them just perceptible. This is probably due to the fact that the nerve elements are more widely separated as we pass from the center outward. In glaucoma, retrobulbar neuritis and other pathological conditions in which scotomata are formed the nerve elements in the area represented by the scotoma are not blotted out en masse at once but are gradually thinned out over a varying period of time, so that at first this area, though able to perceive moderately large objects can no longer perceive the normally smallest perceptible object. We have then not an absolute but an incomplete scotoma. It is obvious then that if in this area we employ as a test object the normally smallest perceptible object a scotoma will be made out, but if a slightly larger object is used the field will appear normal. Sinclair pointed out that a 1*mm* object is just clearly perceptible at a distance of 2M out to 26°, so that to be sure an object will disappear in an area that is just beginning to lose its visual acuity it must not be larger than 1*mm* if used at a distance of 1M.

A 1*mm* object at 1 M subtends an angle of a little less than $\frac{1}{16}°$; a 2*mm* object a little less than $\frac{1}{8}°$. Now let us see what happens when such an object is brought nearer the observer's eye. We will select a 1½*mm* object, the smallest object used with some of our best short radius instruments. This object at 1 M subtends an angle of about $\frac{1}{12}°$ or 5″, but when used with the instrument for which it was designed, it subtends an angle of ½° or 30″. Now a ½° object at 1 M measures 8.7*mm*

in diameter, therefore an 8.7*mm* object at 1 M and a 1½*mm* object at 18*cm*, the range of the instrument for which it was designed, each subtends the same angle; their retinal images are the same size and equally perceptible, therefore these two objects when used with their respective instruments have the same value. But an 8.7*mm* object is far too large to detect any early scotoma that is not absolute. Even a 5*mm* object, the largest object that I use with my screen is too large, for with it I have never been able to detect any early scotoma, and there are many early scotomata that cannot be detected even with a 2*mm* object at 1 M; so that if a short radius instrument is to be employed an object must be used that subtends an angle of not more than $\frac{1}{16}°$, that is an object measuring about ¼*mm* in diameter. But the construction of objects measuring less than 1*mm* is impractical. Also at short range there is not sufficient magnification of the scotoma to make its detection easy, or to accurately outline it. So we have no choice but to use the tangent screen at 1 M or more if early scotomata are to be detected and accurately outlined. The scotoma here shown (Fig. 4 in text), and many others, could not be detected

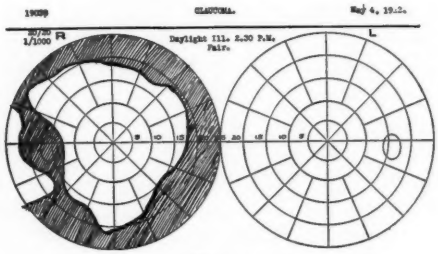


FIG. 4.

with an object larger than 1*mm* at 1 M. The short and long radius scotometric instruments may well be compared with the low and high power objectives of a miscroscope. My microscope carries three objectives a 1″, a ½″ and a $\frac{1}{12}$″ oil immersion. The two low power objectives are excellent instruments. They give a clear definition and a wide field, and it is probable that most of the pathological histology that I know was learned by means of these two objectives, but I

should have missed a great deal of pathology had I never used my oil immersion. The tangent screen at 1 M or more and the 1*mm* object are the oil immersion of scotometry. Short radius scotometric instruments are excellent in their own field of usefulness, but this field is limited.

The screen I offer is constructed as follows: Procure at any art store a frame 40″ x 40″. Have dealer stretch tightly over frame a cotton canvas painted surface "back." Draw on painted surface the vertical, horizontal and long diagonal lines as on chart, then describe the circles, the radii of which represent the natural tangents at 1 M. These radii are as follows:

5°	87.5*mm*
10°	176.3*mm*
15°	267.3*mm*
20°	363.9*mm*
25°	466.3*mm*

The short radiating lines should now be drawn. Only one figure is to be drawn but with two blind spots, the positions and dimensions of which are approximately—

Center to nasal border	245.*mm*
Center to temp. "	347.*mm*
Above horizontal	55.5*mm*
Below "	98.*mm*
Vertical diameter	153.5*mm*
Horizontal diameter	102.*mm*

Cover front of screen with dull black velvet or broadcloth, stretched moderately tight. A suitable stand on which to hang screen can be made by any maker of stands for displaying clothing in shop windows. It should have a sliding vertical adjustment and a T-shaped crossarm at the top. The screen should be fastened firmly at top and bottom so that it will not swing while in use.

Test Objects.—The best test objects that I have seen are those made by Weiss of London, after the design of Traquair. Excellent 1 and 2*mm* objects may be made by using punches

in these sizes. These punches may be obtained at the better grade hardware stores, or old trephine blades may be used. A fine grade of white blotting or dull finish linen paper should be used for white objects, and non-gloss tinted paper, obtained at the art shops, for colored objects. These paper disks may be attached to the flattened heads of ordinary pins of small size that have been filed to the proper size and painted a dull black. White headed pins also make very good test objects. These may be obtained in sizes, 2, 3, 4 and 5*mm*. For colored objects these may first be dipped in strong mineral acid to cut the "glaze," then painted the desired color. These pins are to be inserted into the slit end of a thin metal rod 18″ long, to the other end of which a handle has been attached. Both rod and shafts of pins should be painted a dull black.

Use of tangent screen. Illumination.—Good work can be done by daylight illumination but for uniform results, especially when following up cases, some mode of artificial illumination must be used. The light should be filtered through the so-called daylight bulbs, or similarly tinted glass, by the light of which colors may be seen to better advantage. Some effort should be made to standardize this mode of illumination.

Fixation.—Binocular fixation is not a *sine qua non*, and monocular fixation is not difficult. It is always an aid to fix-

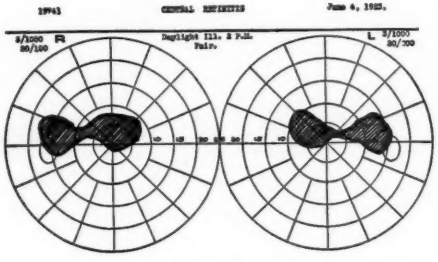


FIG. 5.

ation to map out the blind spot at the beginning of the test, if this is possible. The patient learns that there is a definite place where an object should appear or disappear, and is therefore less inclined to follow it. If it is suspected that the patient is not fixing, this can be quickly determined by going

back to the blind spot, and rapidly checking it up. In the case of a central scotoma a large enough fixation object should be used to be distinctly seen. The blind spot should be outlined first as usual, and will be found to be displaced. The amount and direction of displacement of the scotoma may be estimated by the new position of the blind spot, which has been similarly displaced. (Fig. 5 in text.)

Searching for the Scotoma. The Scotoma Triangle.—In searching for scotomata our method will vary somewhat with the provisional diagnosis in each case. This has reference both to the size and color of the test object, and the mode of procedure. In all cases, however, the peripheral field should first be roughly determined by the confrontation method. Then our efforts should be directed to that part of the field where the scotoma in question is most apt to be found. In reviewing all of the scotomata mapped out by me in the last five or six years, not due to fundus lesions that could be seen with the ophthalmoscope, all were found to be either partly or wholly within a small central area for which I would suggest the name "*Scotoma Triangle*" (Fig. 6 in text). This area is

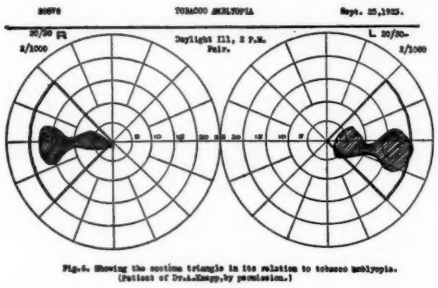


FIG. 6.

bounded by lines extending from the fixation point upward and outward and downward and outward at an angle of 45° from the horizontal, to the 20° circle and the arc of this circle between these lines. If we add to this triangle the rest of the area within the 10° circle, then practically all important scotomata will lie either partly or wholly within this combined area. Portions of the visual field outside this area are rel-

atively unimportant. The scotoma of glaucoma and the tobacco scotoma begin within this triangle, and the scotomata of all forms of toxic amblyopia are partly within it. In all attempts to detect a scotoma an object should be used that is just clearly perceptible in the normal retinal areas. In the case of the early glaucoma scotoma or the scotoma of beginning toxic amblyopia this usually means that a 1*mm* object must be used at a distance of 1 to 2 M. In glaucoma the blind spot should first be outlined as usual, then the areas immediately above and below the blind spot after the following manner; the object should be held steadily and moved very slowly back and forth in a sinusoidal curve, occasionally being held motionless. Since the narrowest part of

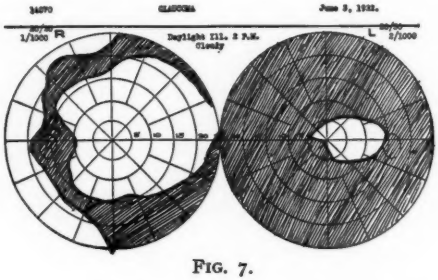


FIG. 7.

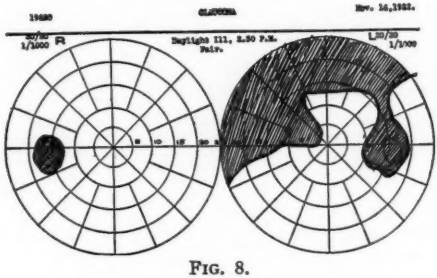


FIG. 8.

this scotoma is where it attaches itself to the blind spot, more time should be devoted to the upper and lower areas of the scotoma triangle than to the area immediately adjacent to the blind-spot (Figs. 7 and 8 in text). The first disappearance

of the test objects should be marked with a mourning pin. Now approach first one side then the other of the scotoma, always at right angles to its border and always from the dark to the seeing area, inserting a pin at each appearance until the entire scotoma has been outlined. These pins should be placed 1″ to 2″ apart depending upon the size and the density of the scotoma. The patient should be given frequent periods of rest and the scotoma should be gone over again to confirm the first findings. We frequently note that while going over an early scotoma the test object will suddenly appear and immediately disappear, indicating that there are in the scotoma minute visual islands too small to be mapped out. Such a scotoma often cannot be detected at all with a *2mm* object at 1 M. This indicates that not only are the nerve elements in this area simply thinned out and not entirely destroyed, but that the thinning out process is not uniform. For this reason we will often fail in our attempts to detect such a scotoma unless we proceed slowly and with the utmost care, and unless absolute fixation is maintained. It will be found that greater concentration in fixation may be obtained if the eye not under observation is closed instead of simply having a blind placed in front of it. In mapping out scotomata due to other causes than glaucoma the same general plan should be followed, remembering that the tobacco scotoma is at first oval in shape and is placed horizontally between the blind spot and the point of fixation. It is always connected with the blind spot, and as it develops soon involves the point of fixation becoming an irregular central scotoma of large size. This scotoma is usually easily detected with a *1mm* white object but should this fail red and green objects of the same size should be used. In addition to mapping out scotomata the tangent screen may be used to good advantage in mapping out and keeping track of gross field defects such a are found in detachment of the retina, hemianopsia, retinitis pigmentosa, etc. In addition to the tangent screen the physician's necessary equipment for accurate field work must include a perimeter and some type of stereoscope for use with Hait's or similar charts. Field taking with the perimeter should be thoroughly mastered and each field thus taken should be carefully checked up by the confrontation method.

As soon as the physician becomes proficient in this latter method the perimeter may be almost entirely discarded, because the more rapid and convenient confrontation method will be found to be sufficiently accurate for most gross field defects. A stereoscope for use with Hait's or similar charts will be found very convenient for detecting early central scotomata, and in specially constructed stereoscopes having a wide angle the blind spot may be mapped out with fair accuracy. A complete office outfit for accurate field work need not be expensive. If a hand perimeter is used instead of the larger instrument, the entire equipment need not cost more than fifty dollars.

REFERENCES.

DUANE. "Tangent Plane for Mapping Scotoma, Field of Vision and Double Images," *Oph. Rev.*, Oct. 1906. "The Tangent Curtain," *Arch. Ophth.*, vol. 43, pp. 420–591.

SINCLAIR, A. H. H. "Bjerrum's Method of Testing Field of Vision; Clinical Advantages and Value in Glaucoma," *Tr. Oph. Soc. U. K.*, vol. 25; *Tr. Oph. Soc. U. K.*, 1925.

SYM AND SINCLAIR. *Oph. Rev.* 1906, vol. 25, p. 141.

BLOCKING OF THE MAIN TRUNK OF THE FACIAL NERVE IN CATARACT OPERATIONS BASED ON EXPERIENCE OF OVER 150 CASES.

By Major R. E. WRIGHT, I.M.S., Madras, India.

(With four illustrations on Text-Plate XXXIII.)

IN the *Archives of Ophthalmology*, Vol. LII, No. 2, 1923, page 166, I published a note on blocking the main trunk of the facial nerve in cataract operations. I then hoped that some ophthalmic surgeon would investigate the method, but to my knowledge nothing on this subject has since been published. As I consider the procedure is of great importance in connection with cataract work under certain conditions, I wish now to draw attention to the fact that blocking of the 7th nerve at or near its exit from the stylomastoid foramen may be performed quickly and simply in the majority of cases. There is apparently only one drawback to successful blocking which will be referred to again later, namely, the continuation of paresis or paralysis which occurs in a small percentage of cases. The advantages of obtaining hemiparalysis are enormous if one has to deal with unruly, uneducated patients. One often hears how good the Indian patient is, but to any operator of experience in this part of the world who has also witnessed cataract work in the west, the idea is grimly amusing. When one gets an obstinate old Madrasi cooly on the table it is unreasonable to expect anything but what the rapidly fluctuating impressions of a preoccupied mind suggest. The eyeball on such occasions resembles in its continuous motion the glass globe target of a circus rifle gallery, and it is almost as difficult to deal with. Having secured a "hit" with the fixation forceps, the sub-

sequent chasing of the plane of the limbus with knife or needle takes up so much of the operator's attention that any procedure which puts the circumorbital muscles out of action and eliminates danger through squeezing must necessarily be of the greatest comfort. Uncontrolled and irrational patients may help to enliven the morning of the habitual operator and his trained staff and stimulate their very best efforts, with excellent results. The occasional operator or surgeon of an isolated district hospital, however, has so many handicaps even in simple straightforward work that the troublesome patient must be a nightmare. It is for those who have not the opportunity of operating on numbers of cases regularly that the method I am about to describe will constitute the greatest boon. It is a rapid and moderately easy way of rendering the circumorbital musculature flaccid (which is eminently desirable in difficult cases), and is much more effective in its results than is the case with any partial circumorbital blocking. The side of the face to be operated on becomes absolutely masklike, and from the point of view of external pressure on the globe one has only to consider other sources, *e.g.*, the levator action as described by Kirkpatrick, the action of the muscles of the globe itself, or a "full" orbit giving rise to a bulging eye whatever may be its cause.

The disadvantages appear to be:—(a) In a certain number of cases paresis or paralysis persists far longer than is desirable and introduces the complication of a lagophthalmos. In such it is necessary to do a partial tarsorraphy after the section has healed. In 4 cases out of 150 this occurred; the nerve taking up to 3 months in the most protracted case to recover complete function. In none of these cases did the eye suffer, the final result of operation being just as good as if nothing untoward had happened.

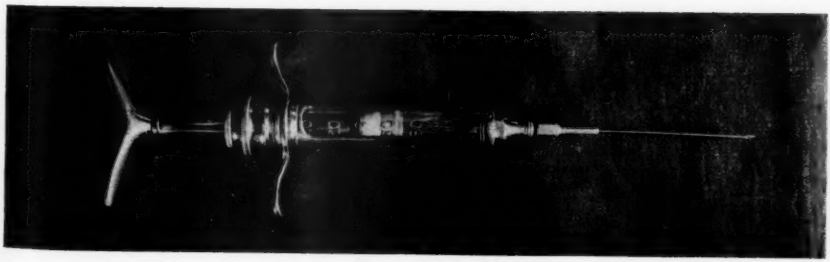
(b) In all cases the lids must be carefully approximated and kept in position whilst the dressings are applied. Without going into tiresome details of various ideas tried and given up, it will suffice briefly to describe the method now used. This has gradually evolved from observations on 150 cases (dealt with prior to March, 1926). An "Alston washerless" syringe of 60 minim capacity (made by the Dental Manufacturing Co., London) is used. It is of good balance, fills the

ILLUSTRATING MAJOR R. E. WRIGHT'S ARTICLE, "BLOCKING OF THE MAIN TRUNK OF THE FACIAL NERVE IN CATARACT OPERATIONS, BASED ON EXPERIENCE OF OVER 150 CASES."

FIG. 1.

FIG. 2.

FIG. 3.



The syringe used

hand and has a perfectly smooth piston action. It is illustrated in the photograph. The screw-on needle is 50*mm* in length, of fairly large bore and not too flexible. A shorter needle might with advantage be used in some cases, but in others the long one is more convenient. The solution used is 4% novocaine 2 parts, $\frac{1}{1000}$ adrenalin 1 part, freshly made up. The patient lies on the side, the assistant at his vertex, the operator opposite his face. The skin is sterilized with a solution of picric acid in alcohol. The lobe of the ear is pulled forward and upward, see illustration. The syringe is held lightly in the right hand whilst a finger of the left hand palpates the tip of the mastoid process. The needle is inserted just behind the skin fold made by the drawn up lobe, about the level of the tip of the process, and is pushed upwards, inwards and backwards towards its anterior face. This position of inserting the needle is of necessity only approximate and depends to a large extent on the fullness of the soft parts in this region. On impinging it is withdrawn lightly and thrust a little deeper; this manœuvre being repeated till the point of the needle advances freely just deep to the inner aspect of the anterior face of the mastoid. This is the proper level, with the needle base lying superficial to the ramus of the jaw, its shaft hard up against the deep aspect of the mastoid process, and its point somewhere between the latter and the stylomastoid process, below the jugular process. Again one makes a series of withdrawals and advances of the needle pivoting round the point of puncture and feeling with the point of the needle in the diagastic fossa till the syringe is finally in an almost vertical position, see photograph. There is practically no danger of wounding the maxillary or occipital arteries or even the jugular vein provided one hugs the mastoid whilst traveling round from the almost horizontal first position to the final position of the needle. It does not do any harm to wound the jugular vein provided one does not empty the syringe into it. Quite possibly this would not do any harm either, but I have not had the experience. Frequently one gets twitching when the nerve is struck with the needle point. Success is assured if the injection is made with the needle in the position which produced a twitch. It is always undesirable to jam the needle

into the stylomastoid foramen. In one case of delayed recovery the paralysis was produced by direct injury with the needle without injection, the needle wounding the nerve in the foramen. On getting the needle into the vicinity of the foramen an injection of 1 or 2 *ccs* of the mixture is made. The needle is then withdrawn and if the nerve is successfully blocked, the patient will exhibit facial paralysis in 5 to 15 minutes. It is well to consider the bony variations in this region and also the relation of the soft parts. In horizontal sections it will be observed that the line joining the posterior border of the mandibular ramus and the styloid process ordinarily just impinges on the jugular fossa. In some specimens the line carries through the jugular vein. The line which it is desirable to adopt is parallel and posterior to this, approximately joining the anterior face of the mastoid process with the posterior border of the jugular process. It must be realized by the operator that the under aspect of the temporal bone varies considerably in different people. The jugular process is often prominent and rough and the occipitomastoid suture may be at the bottom of a deep gutter immediately behind the stylomastoid foramen. The tympanic plate is sometimes very irregular and may give rise to a deep, cleft-like, auricular fissure. The mastoid process may be short vertically, broad from side to side and exhibit grooves which catch the needle.

Difficulties and failures:—At first there were numerous failures, but of late they have been reduced to practical limits. Out of the first 35 injections in 1926, 34 were successful. Early failures may therefore be put down to inexperience. Of late, failure to bring about blocking has been due to two causes:—(a) Unusual prominence in the parotid region. Certain patients exhibit such an abnormal protrusion of soft parts over the ramus of the jaw as to make it very difficult to feel with the needle. (b) Unusual bony development. Mastoid processes which are markedly hooked forward or which are abnormally flat present difficulties. A very prominent tympanic plate with a deep auricular groove may upset one's judgment. In certain cases where the method above described has failed, successful blocking has been obtained by inserting the needle in the horizontal plane, over the anterior

border of the mastoid processes high up where it forms an angle with the tympanic plate, and directing it backwards and slightly upwards. A knowledge of the anatomy of the parts concerned is, however, the chief factor in ensuring success. My thanks are due to Dr. K. Koman Nayar and Mr. C. G. Taylor for their assistance.

THE TREATMENT OF BULLOUS KERATITIS.[1]

By Dr. ARNOLD KNAPP, New York.

BULLOUS keratitis is generally an intractable disease which resists the usual form of treatment. While it often occurs in eyes suffering from severe irido-cyclitis or glaucoma, it may, as in the case to be described, be principally a keratitis. Its main symptom is the appearance of one or more large blebs. As Collins and Mayou (*Pathology and Bacteriology of the Eye*, II ed., p. 366), point out, the new epithelium which forms over an abraded area fails to acquire its necessary firm attachment to Bowman's membrane. It becomes raised in the form of a vesicle, which on rupturing, leaves a fresh abrasion. In the formation of the new vesicle the filaments of the corneal nerves which break up and terminate in the epithelium become stretched, and the patient complains of great pain. This disappears as soon as the vesicle ruptures and the tension on the nerve filaments is relieved. This formation is liable to recur causing relapsing attacks of pain. Fuchs, *Augenheilkunde*, 13th ed., p. 383, in the paragraph on pannus degenerativus, states that in bullous keratitis, the wall of the large blebs consists not only of epithelium, but of a connective tissue layer. This new formed connective tissue bridges over the gap and pushes the epithelium forward, extending between this and Bowman's membrane. Treatment, according to Fuchs, may call for iridectomy, or the bleb can be cut away and the base treated with iodine; if the blebs continue to recur enucleation is the last resort. Gruter ("Das Herpes Virus, seine etiologische

[1] Read before Section on Ophthalmology, N. Y. Acad. Med., May 19, 1926.

und klinische Bedeutung," *M. m. W.*, 31, Aug. 1, 1924) states that anatomically there is necrosis of the epithelium and of the adjoining parenchyma. The hypertrophied basal cells in the epithelium swell up. The basal layer is sometimes lifted up from Bowman's membrane in fissures. This explains the observation that in herpetic disease of the cornea the entire epithelial layer can be readily lifted up with a spatula.

CASE REPORT—L. K. 69 years old, was first seen on December 1, 1925; he stated that the sight in the left eye had been affected for five months, and that he suffered from frequent and severe attacks of pain which accompanied the development of fresh blisters. S = $\frac{20}{100}$. In the lower half of the cornea there were blebs and denuded areas in the superficial epithelium and deep striated opacities in the cornea; sensibility diminished. The anterior chamber and iris were negative. Tension not raised: General examination of the patient was negative. He was treated with every form of local and general treatment, without avail, and blebs continued to form with characteristic paroxysms of pain. On December 19th, the wall of the bleb was cut away. With a spatula the entire epithelial layer of the cornea was found loose and was removed, leaving only a small segment of epithelium along the upper margin of the cornea. 1% silver nitrate solution was applied to the denuded cornea, atropin, boric acid salve and bandage applied. After some pain the eye quieted down. Dr. P. C. Jameson has observed the separation of the epithelium over the entire cornea in a similar case. This also confirms Gruter's findings. On January 9, 1926, a bleb had again formed with much less severe symptoms. The bleb wall and then the entire epithelium of the cornea was again cut away up to the margin; 1% silver nitrate applied. This was followed by no reaction. On January 13th, there was a superficial infiltration of the cornea in its upper half. The eye was treated with 1 to 2,000 silver nitrate irrigations. Gradual recovery; the infiltration did not advance. January 26th; faint opacity of cornea, marginal vascularization. Surface covered, anæsthetic. The cornea gradually recovered. No further blebs formed, and on May 17th, there is a faint scar of the cornea, periphery clear with a few vessels. Epithelium intact. S = $\frac{3}{100}$; pupil medium. Tension n. Sensation reduced. The histological examination of the epithelial layers removed in this case showed that these were in part necrotic, in others the basal cells were

swollen. No connective tissue layer as described by Fuchs was present.

The treatment for bullous keratitis, which this case suggests, consists in the complete removal of the corneal epithelium, not only of the bleb wall but of all of the rest of the corneal covering which is found to be so easily lifted up with a spatula. An application of 1% silver nitrate should then be made, atropin and boric acid salve, and a bandage applied. If the bleb reforms, the same procedure must again be followed out. In the case just described this was followed by healing and a cessation of the bleb formation.

TUBERCULAR IRIDOCYCLITIS AS OBSERVED WITH THE SLIT-LAMP WITH REMARKS ON TUBERCULIN TREATMENT.[1]

By Dr. CLARENCE KING, Cincinnati, Ohio.

IF tuberculosis of the iris exists in a given case, any means which aids in establishing the diagnosis is of the utmost importance. Such a diagnosis implies, of course, a definite therapy and is significant from a prognostic standpoint.

A great deal can be accomplished by the proper treatment of tubercular iritis. It is particularly true of this disease that effective therapy depends on determining the nature of the process with which one has to deal. We all have encountered in practice cases of chronic iridocyclitis in which it has not been possible to determine the etiological factor. These cases pursue a protracted course, often with declining vision; and not a little of the anxiety of the patient and of his family is due to the physician's inability to offer an adequate explanation of the cause of the disease and the failure to obtain rapid improvement. In such cases, the condition is often regarded by the ophthalmologist as possibly tubercular. There is a hesitancy to push tuberculins to the point where a local ocular reaction, as well as general reaction, clinches the diagnosis. Such use of tuberculin is advocated by some authorities and decried by others. Many internists are opposed to the use of tuberculin, and this attitude has doubtless influenced some ophthalmologists who fear to use it either for diagnostic or therapeutic purposes. There is an urgent need for cooperation on the part of internists, ophthalmologists, and

[1] Read before the Buffalo Ophthalmological Club.

laboratory workers to the end that the indications for the use of tuberculin in ophthalmology, at least, may be more precisely defined.

In America, the fear of the possible harmful effects of tuberculin for diagnostic purposes is probably the chief cause of the discrepancy which exists between the Continental and the American viewpoint in regard to the importance and the frequency of tuberculosis in the etiology of iritis. Gilbert (1) presents the following figures as to the relative frequency of the various causes of iritis or iridocyclitis. These figures were compiled in 1921 and are based on 500 cases of iridocyclitis:

Tuberculosis				
(a) Certain 173				
(b) Probable Cause 55	228	=	45.6%	62.2%
Lues 79				
Tuberculosis or Lues 4	83	=	16.6%	
Rheumatism	15	=	3.0%	
Gonorrhea	15	=	3.0%	
Mild Sepsis	3	=	.6%	
Furunculosis or Diabetes	4	=	.8%	
Teeth	6	=	1.2%	
Ethmoid Suppuration	2	=	.4%	
Angina	6	=	1.2%	
Peliosis Rheumatism	1	=	.2%	
Influenza	8	=	1.6%	
Pneumonia	3	=	.6%	
Erysipelas	2	=	.4%	
Meningitis Epidemic	1	=	.2%	
Typhus 1				
Dysentery 2				
Paratyphus 1	5	=	1.0%	
Acute Enteritis 1				
Weil's Disease	2	=	.4%	
Herpes Zoster & Herpes Iris	15	=	3.0%	
Vaso and Nephri sclerosis	5	=	1.0%	
Heterochromia	4	=	.8%	
Gout	5	=	1.0%	
Unknown	87	=	17.4%	

For purposes of comparison, Gilbert submits the statistics of Haas in 1898 which apply to 264 cases. They are as follows:

Tuberculosis	128	=	48.48%
Tuberculosis of the iris with negative general findings	9		
Lues	27	=	10.00%
Rheumatism	7		
Gonorrhea	2		
Measles	1		
Diphtheria	1		
Influenza	2		
Exposure to Cold	1		
Diabetes	1		
Blood Disease (tuberculosis?)	1		
Atheroma	3		
Albuminuria	3		
No etiology	186	=	73.5%
Unexplained	78	=	26.5%

As a further basis of comparison, the statistics of E. E. Irons and E. V. L. Brown are submitted. These figures pertain to cases observed in Chicago and were presented to the section of the American Medical Association in 1923:

	Alone	*With other Infections*	*Total*	Coincident Infections							
				Syphilis	*Gonococcal*	*Tuberculosis*	*Dental*	*Tonsillar*	*Sinus*	*Non-Venereal Genito-Urinary*	*Other Infections*
Syphilis	2	13	15			1	8	9	2		
Gonococcal Infection	1		1								
Tuberculosis											
Dental Infection	5	4	9					2	2		
Tonsillar Infection	19	18	37	4		2	15		1	1	1
Sinus Infection		1	1				1				
Genito-urinary, Non-Venereal	3		3								
Other Infections	1		1								
No infection found			2								
Combined Infections		24	24	7	2	4	19	22	10		5
Undetermined		7	7	3		1	2	1			2
Total			100								

The figures of Baum, 1890–1900, are referred to as indicating that tuberculosis was found as the cause of iridocyclitis in only 15.2% of the cases. The etiology was unknown at this time in 70% of the cases. He attributes the low incidence of tuberculosis in Baum's tables to the failure to realize the importance of tuberculosis as a causative agent in iridocyclitis. In Gilbert's statistics, the etiology was known in 83% of the cases. Löwenstein (2), in a recent monograph on tuberculosis of the eye, states that tuberculosis is the cause of fifty per cent. of the diseases of the uveal tract. In reviewing Löwenstein's monograph, Axenfeld, in the "Klinische Monatsblätter," makes the comment that Löwenstein's findings should be particularly enlightening to American ophthalmologists who attach so much importance to focal infection in iritis. It is probable that the Germans do not realize the significance of focal infection, particularly that arising from the teeth in iridocyclitis. It seems equally true that tuberculosis as a cause of this disease is underestimated in America. If the statistics of Gilbert are even approximately correct, it is urgently necessary to exhaust all resources at our disposal to arrive at a diagnosis; for failure to do so may result in serious consequence to our patients.

One of the most important of these resources is the examination with the slit-lamp. Following the usual order of procedure in examination, we may consider the character of the precipitate seen on the posterior surface of the cornea with the slit-lamp. The characteristic feature of the deposits on Descemet's membrane in tubercular iridocyclitis is the early development of gray, lardaceous, nodular or irregularly gobular precipitates. In general, we observe with the slit-lamp deposits on Descemet's membrane which consist of red and white cells and of pigment cells. We also have disintegration and conglomeration products which appear as dust-like or fibrinous deposits. We also observe star-like or clumped masses or dust-like accumulations. In the early stages of tubercular iritis, we observe red cells, small white cells and pigment cells, and perhaps some fibrin and droplets. The clumped nodular precipitates to which reference is made above, develop earlier than in most other forms of iritis. These lardaceous clumped conglomerations are rarely

seen except in the late stages of iritis of focal infection or gonorrhea. They are found in sympathetic iritis, and to a lesser degree, in luetic iritis. Actual tubercles can develop on the posterior corneal surfaces as demonstrated by Krückmann. These changes can be observed better with the slit-lamp than with a Coddington loupe, just as a distant object can be seen better with a powerful telescope than with an opera glass. The clinical picture of tuberculosis of the iris has been the subject of detailed consideration by Professor Leonhard Koeppe in his book on the slit-lamp. (3) His classification, which is also that which he presents in his course on the slit-lamp, is followed in this article.

The more subacute or chronic forms of tuberculosis principally engage our attention with the slit-lamp, as they reveal a clinical picture which is typical. There are two characteristics observed in tubercular iritis of this type. One typical change is the somewhat diffuse, glassy swelling of the iris tissue, particularly in the region of the sphincter and the collarette. The other is the formation of nodules. In the glassy swelling the iris stroma appears, in the part involved, to be permeated with a half transparent, grayish coagulum which has the appearance of sugar candy and which is so ill-defined that it can easily escape notice unless looked for under the proper conditions of illumination and magnification. This grayish, glassy change may lie on the meshes of the iris stroma and may invade the stroma itself. The region affected seems more opaque than the surrounding tissue, which frequently displays enlarged blood vessels. By the confluence of neighboring areas so involved, grayish glassy projections of considerable extent may be formed. Posterior synechia are always present. Nodules in tuberculosis of the iris are seen with the slit-lamp particularly at the pupillary border but can be located at the collarette or in the ciliary portion. Pupillary nodules are observed as an anterior form or a posterior form according to their location at the pupillary border in the anterior or posterior surface of the iris.

The posterior nodules occur on the pigmented border of the iris and appear as grayish white, glassy protuberances of varying size. They may be so small as to require high power to locate them and occasionally they may attain the dimen-

sions of a pin head. They may escape notice when the pupil is contracted by light, being hidden by the pupillary border. They can extend and elevate the pigment at the iris border and cause its disintegration. The anterior type of nodule reveals the tissue transformation more definitely, as it is immediately accessible to observation. The iris stroma itself is seen to have undergone a change into a glassy, thickened, gelatinous protuberance. The nodules at the collarette and the ciliary portion are practically identical and are somewhat modified by their location. It is probable that these tissue alterations represent but varying phases of the same underlying pathological process. The picture of the torpid, subacute conditions, described above, may be transformed by the presence of a more or less pronounced inflammatory reaction. A diffuse iritis or iridocyclitis with marked exudate and with all the evidence of acute inflammation may be tubercular in origin. The extent to which the acute exudation aspect of the disease enters into the clinical picture is of the utmost significance. Tuberculoma presenting the well-known microscopic picture may also be observed. In regard to the differential diagnosis it must be stated that in the present status of our knowledge the clinical appearance of tuberculosis as revealed by the slit-lamp is identical with that of lues and sympathetic inflammation. Lues is to be excluded by the general clinical findings, the history, and the Wassermann tests. If no injury has occurred to the eyes, sympathetic inflammation can be ruled out. In regard to the forms of iritis which undoubtedly arise from focal infection, further observation with the slit-lamp must be carried out before it can be said that they never present the clinical appearance described above. On "a priori" grounds, it may be assumed that they do not do so; as lues, tuberculosis, and sympathetic inflammation are akin in their underlying pathology, and hence, very frequently display similar ocular manifestations. Leprosy of the iris is said to show a similar nodular thickening but the disease need not be considered in our practice.

One or two points may be emphasized in connection with technique. It is often possible to demonstrate tissue alterations which would otherwise escape notice by a grazing

sunset illumination. The illuminating arm is placed as far as possible to the temporal side so that the light falls on the iris with grazing incidence. This is an extremely valuable method to reveal changes in the iris surface, which is strikingly illuminated by the light reflected from the immediately underlying tissue. In tubercular iritis the yellow filter is sometimes of great advantage, and the red free filter may be found useful.

For the clinician the establishment of a diagnosis is significant in as much as it implies a definite therapy. It is hoped, therefore, that some comment on the use of tuberculin in the light of the newer conceptions of tuberculosis in general will not appear too great a departure from the subject in hand. Reference was made at the beginning of this article to the conflicting opinions of the value of tuberculin in eye disease and to the uncertainty as to the attendant dangers. It now appears that the indication and contra-indication for the use of tuberculin can be more strictly defined and that dangerous reactions can be avoided. For this new attitude we are indebted to the work of Ranke (4) in connection with pulmonary tuberculosis. Ranke recognized these stages in tuberculosis:

1. A primary stage in which the disease is localized and is accompanied by a normal sensitization to the tubercular toxin.

2. A secondary stage representing the epoch of generalization with hematogenous and lymphagenous dissemination and with evidences of hypersensibility.

3. A tertiary stage of isolated tuberculosis in one or more organs with acquired relative toxin insensibility.

Others before Ranke have classified tuberculosis into primary, secondary, and tertiary stages. The merit of his work lies in the fact that he considers the local changes in the light of the total immunity of the body and in relation to the general constitutional disturbance. At this point it may be permissible to recall a fundamental fact in immunology, that of allergy. It is known that the action of an antibody upon a foreign protein is comparable to a digestive process. Just as during digestion in the intestine at certain stages, intensely toxic by-products may be generated, so in the conflict between

antibodies and bacilli there may arise, by incomplete or too rapid digestion, toxic substances which can cause local or general reaction. A change in the bodily organism by which it reacts with heightened local or general sensibility to a given antigen is termed allergy In this sense the Von Pirquet cutaneous test for tuberculosis belongs in the category of allergic phenomena. According to Ranke, therefore, the histological variation in the structure of tubercular tissue is an expression of the allergic reaction of the organism in general.

We know from pathology that the tubercle bacillus can cause all types of inflammation in the ocular tissue, but it is recognized that two typical forms of reaction can be differentiated. One is the benign, proliferative type with tendency to scar formation. The other is the malignant, exudative, destructive type with tendency to necrosis and caseation. Both reactions are usually observed at the same time but as a rule one or the other predominates. It has been demonstrated by Schieck (5) and others that the malignant, toxic variety of reaction occurs in the state of hypersensibility to the toxins of tuberculosis whereas the benign, torpid, proliferative tissue reaction occurs in the period of relative insensibility, that is, in the third state of Ranke. There is, therefore, a parallel between the two predominant tissue reactions and the stage of immunity. Schieck, in a brilliant contribution to our knowledge on the subject, was able to demonstrate these three stages of Ranke in iris tuberculosis. Werdenberg (6) has recently reviewed this work and has laid down this dictum: The modern viewpoint of tuberculosis demands that the clinical interpretation of ocular tuberculosis must be determined by the character of the pathological changes present in connection with the tubercular constitutional disturbance and the state of the total immunity. Only from the clinical picture as a whole can any useful indication be found for suitable therapy.

The possibilities of interpretation of the minute pathological changes observed with a slit-lamp in reference to the state of immunity of the body are interestingly disclosed by the findings in two cases referred to by Schieck. It will be necessary in this connection to refer to some fundamental conceptions of Ranke in regard to the structure of the tubercle as

determined by the state of immunity of the body in general in regard to the tubercle bacillus and its products. Ranke holds that the reaction of the tissue upon the presence of the tubercle bacillus displays two predominant features. One component of this reaction is the response of the tissue to the tubercle bacillus acting as a foreign body The other component is represented by the tissue changes due to the toxins of the tubercle bacillus. In the primary stages in which no hypersensibility to the toxins of the tubercle bacillus exists, the presence of the tubercle bacillus stimulates the fixed connective tissue cells to proliferation. They become transformed into epithelioid cells with more peripheric giant cells. Other tissue elements near the bacillus are destroyed by the toxins, and frequently caseation results. The toxins spread beyond the zone in immediate proximity to the tubercle bacillus and bring about a "perifocal inflammation." The surrounding tissue becomes hyperemic and may be stimulated to form new connective tissue fibers which may lead to encapsulation.

In the stage of hypersensibility to the tubercular toxin, the tissue around a tubercular focus responds with violent inflammation. This inflammation is allergic in character. The toxic reaction completely overshadows the foreign body reaction. There is a rapid extension of the perifocal inflammatory zones with marked inflammatory features. The process becomes diffuse and exudative and progressively destructive in character.

The third stage represents a return to the type of tubercle in which the foreign body reaction predominates. Due to a development of relative immunity, the lymphogenous and hematogenous metastases are less frequent The tubercle shows the epithelioid cellular reaction with diminished or no signs of perifocal inflammation. Due to the antibodies in the lymph and blood, the tubercular process is confined to certain areas. Pulmonary phthisis is an example. In the third state, in which immunity is established, the bacilli reaching the eye through the circulation are dead or so low in vitality that only a mild foreign body type of reaction occurs. In the first case they can act only by their toxins. In the second case they give rise to a torpid nodule. This

brings us to the two illustrative slit-lamp studies of Schieck to which reference was made above.

CASE I.—11-3-1920. For three weeks the patient noticed fine point and line-like cloudiness in front of his left eye. Right eye blinded by an injury. Findings: pinkish barely discernible circumcorneal injection. Corneal reflex normal. With slit-lamp fine colorless deposits were observed on Descemet's Membrane. Barely visible dust-like cloudiness in aqueous. Pupil reacts normally. Iris details even with high magnification normal except that below and to the inside there appeared outlined against the pupil and arising from the pupillary border a rod or club-shaped projection, exudative in character. At the lower circumference of the pupil appeared a few minute glassy globules. The anterior lens capsule showed pigmented and non-pigmented deposits.

11-7-20. Upon giving *2mg* old tuberculin abrupt temperature rise to 37.7°. Prescribed light treatment and tuberculin.

11-9-20. The rod-shaped structure has entirely disappeared. Pupillary margin at point involved completely intact. Some cloudiness in aqueous. Descemet's shows homogeneous minute deposits.

11-21-20. Discharged cured. Vision = $\frac{6}{6}$.

CASE II.—Forty-five year old woman. 5-26-1915. Pain in right eye for 11 days. Findings: At the lower pupillary border a few glassy nodules in a slightly irritated iris. Pupil responded to atropin except at the site of the nodules. Finest deposits on the Descemet's Membrane and on the lens capsule. Aqueous slightly turbid. Ophthalmoscopic examination: Area of old choroiditis when looking down. Vision $\frac{1}{10}$. Tuberculin reaction positive. Wassermann reaction barely positive. With light treatment and tuberculin injections, nodules disappeared in three weeks.

Schieck regards the first case as due to the action of toxins in consequence of their tendency to the formation of an exudate instead of a nodule; whereas in the second case, he regards the reaction as arising from the bacillus which was no longer capable of active development.

From what has been said above, it is obvious that the task

of specific therapy with tuberculin must be to invoke a beneficial reaction in the body by increasing the activity of this defense mechanism of the cells and to avoid injurious reaction in the stage of hypersensibility with marked allergic features. To give tuberculin to a patient with violent local and general reaction and in a state of hypersensibility to this product of the tubercle bacillus is to invite disaster. In such cases tuberculin is contraindicated. Tuberculin is indicated in the mild, benign, proliferative forms of ocular tuberculosis with relative decreased sensibility. Werdenberg believes that it is well in using tuberculin for diagnostic purposes to avoid general reaction and he holds that it should never be pursued to the point of local ocular reaction. He points out that tuberculosis is a disease of infinite variety in its manifestations. Clear-cut, pathognomonic clinical pictures are not usually observed. The state of immunity naturally varies widely from time to time. Consequently, it is needful to proceed cautiously in the use of tuberculin, to begin with very minute doses and to gradually increase them. It is absolutely necessary to adapt the treatment to the individual case. It goes without saying that the administration of tuberculin in ocular tuberculosis must be preceded by an exhaustive consideration of every phase of the local and constitutional tubercular disturbance as well as the laboratory disclosures. The slit-lamp is an indispensable adjunct in the study of the minute tissue changes in many cases of ocular tuberculosis and often affords a contribution to our knowledge which, when properly interpreted in connection with other clinical data, may well form the basis for a rational therapy.

REFERENCES.

1. W. GILBERT. "Erkrankung des Uvealtraktus." *Handb. d. Ges. Augenheilk.*

2. A. LÖWENSTEIN. *Die Tuberkulose des Auges.* Urban & Schwarzenberg, Berlin-Wien, 1924.

3. L. KOEPPE. *Die Mikroskopie des Lebenden Auges.* Band I & II. Springer & Co., Berlin.

4. K. E. RANKE. Primäraffekt, Sekundäre und tertiäre Stadien der Lungen-tuberkulose. "Die primäre Lungentuberkulose des Menschen." *C. Arch. f. kl. Med.*, Bd. 119, Heft. 3.

5. SCHIECK. "Die Abhängigkeit des Verlaufes der Tuberkulösen Prozesse am Auge von dem Stadium der Allergie des Gesamtorganismus. *Arch. F. O. G.*, 1921, Bd. 105.

6. ED. WERDENBERG. "Die Augentuberkulose im Licht der Neuen Tuberkuloseforschung." ***Klinische Monatsblätter für Augenheilkunde***, December, 1925.

FURTHER STUDIES ON THE LIGHT SENSE IN EARLY GLAUCOMA[1]

By Dr. GEORGE S. DERBY, Dr. J. HERBERT WAITE, and Mr. E. B. KIRK.

(From the Department of Ophthalmology, Harvard Medical School, and the Teaching Service, Massachusetts Eye and Ear Infirmary.)

(*With nine illustrations on Text-Plates XXXIV.–XXXVI.*)

THE work which is to be reported here is a continuation of the study on the light sense in early glaucoma which was presented at the London Convention last summer and published in its proceedings. For the benefit of those who are not familiar with it, we may be permitted to summarize the essential features. Some three years ago a very accurate machine was constructed by which the minimum amount of light (L.M.) which the eye can perceive can be measured and recorded with great accuracy. It is also possible to measure the light difference (L.D.), or the smallest difference in intensity that can be perceived between two sources of light. For expression of such low intensities of light as are used, it seemed necessary to have some unit to eliminate decimals, and the micro-millilambert was adopted, which signifies one-millionth of a millilambert, about equivalent to 1/100,000 of a meter candle. This is written μ.m.l. and means the unit intensity at the screen. In order to get accurate results it was found necessary to take the size of the pupil into consideration, and finally all pupils were fixed with pilocarpine, then measured. All measurements were mathematically corrected to the basis of an arbitrarily chosen 5*mm* pupil.

[1] Presented before Am. Ophth. Soc., Hot Springs, Va., June, 1926.

All patients were pre-exposed for ten minutes to a definite amount of light before beginning the threshold readings, so that they started at the same level. Our normal light curve was constructed by records from one hundred normal eyes, and since the L.M. readings vary with the duration of dark adaptation they are best shown by means of a curve using as ordinates the value of the light intensity at the screen, and as abscissæ the time in minutes from the onset of darkness.

It soon became evident that the L.D. determinations failed to show any changes in glaucoma at the low level at which we were working, and, therefore, we abandoned further work along that line for the time being.

On the other hand, examination of cases of established glaucoma showed a marked alteration of the L.M. in that the ultimate threshold of the glaucomatous eye is higher than that of the normal eye, and the rate of dark adaptation is retarded. Indeed. in advanced glaucoma the L.M. is so high as only to be elicited by the highest intensities which the machine gives.

The most suggestive curve which we showed in our last year's paper was the study of thirty-nine "normal" eyes of patients having definite primary glaucoma in the other eye. The light minimum of these so-called normal eyes was plotted and gave an abnormal curve,—that is, a curve either showing delay in dark adaptation, or an ultimately higher threshold than the normal, or a combination of the two. If this observation be confirmed, it is evident that we have an additional test of value in the diagnosis of early glaucoma, and in this second communication we wish to present the further results of our work.

In the first place, to demonstrate a typical curve of established glaucoma, a graph of a number of glaucomatous eyes is presented. Indeed, in many cases of glaucoma the curve lies so high that it cannot be recorded on our standard chart, as this only runs up to 180 μ.m.l., while many of these curves fell well up in the hundreds and even higher; thus we indicate the high curves by the notation "too high to plot," or by putting in a conventional curve in the upper right hand corner of the chart.

ILLUSTRATING ARTICLE OF DR. GEORGE S. DERBY, DR. J. HERBERT WAITE, AND MR. E. B. KIRK, "FURTHER STUDIES ON THE LIGHT SENSE IN EARLY GLAUCOMA."

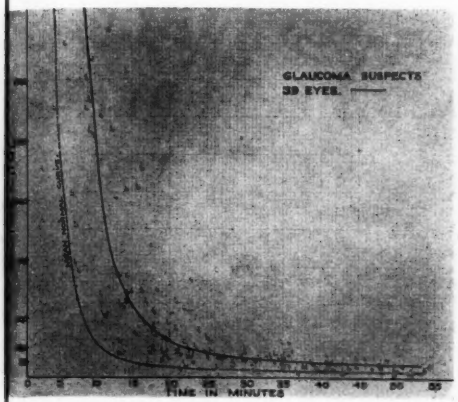


PLATE 1. The light curve in 39 "normal" eyes of patients in whom the other eye was definitely glaucomatous.

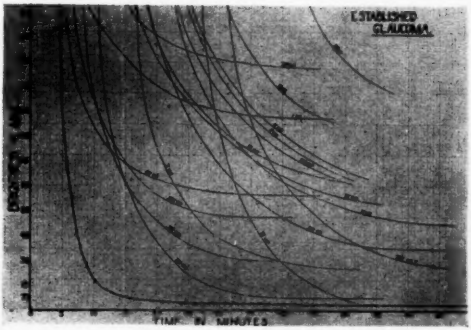


PLATE 2. Glaucomatous light curves. In many cases the curve cannot be plotted on this chart as it lies far above the level shown here.

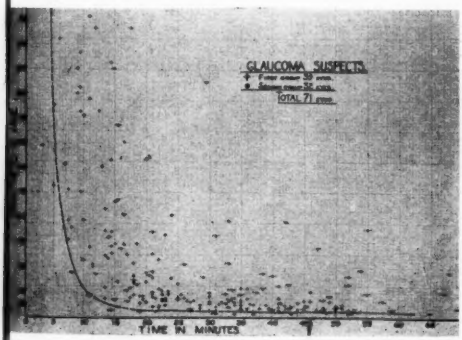


PLATE 3. 32 additional cases of "normal" eyes, in which the other eye was glaucomatous, tested during the past year and added to the 39 original cases. First series designated by +. Second series designated by ●.

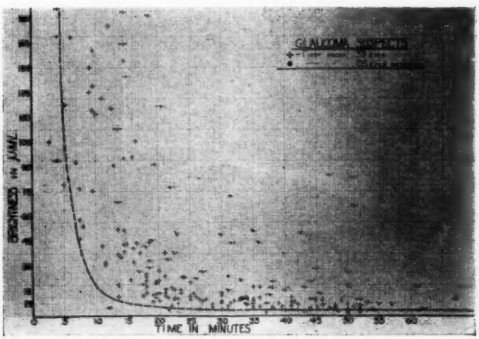


PLATE 4. 39 "normal" eyes, in whom the other eye was glaucomatous, tested a year ago, 28 of which were retested a year later. Some of these eyes had become definitely glaucomatous. The retests show in general a higher level of the light curve. Original tests designated by +. Later tests designated by ●.

ILLUSTRATING ARTICLE OF DR. GEORGE S. DERBY, DR. J. HERBERT WAITE, AND MR. E. B. KIRK, "FUTHER STUDIES ON THE LIGHT SENSE IN EARLY GLAUCOMA"

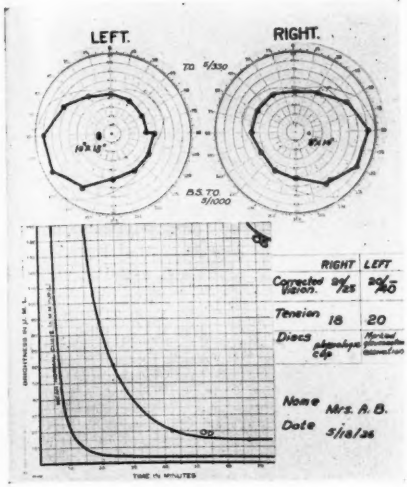


PLATE 5. Shows the effect of rise of tension on the light curve. See text.

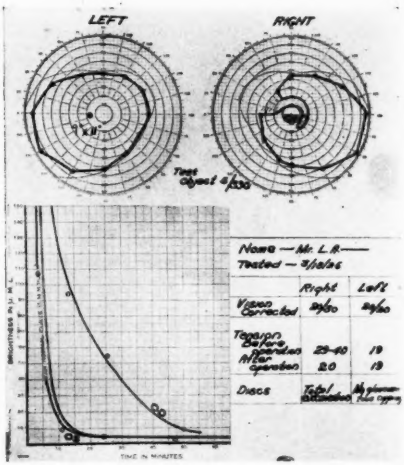


PLATE 6. Chronic simple glaucoma of right eye induced by nævus of face and lids. Light curve raised. Left eye normal with normal light curve. See text.

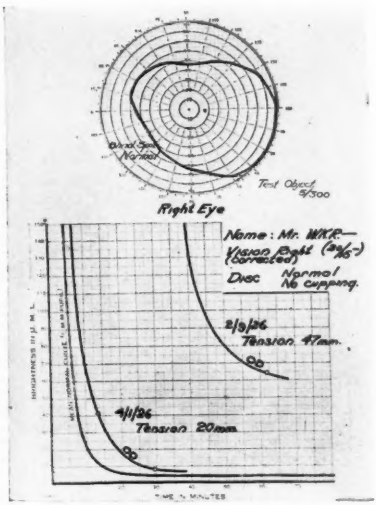


PLATE 7. Shows a markedly changed light curve in a glaucomatous left eye. In the right eye there are no signs of glaucoma, but a somewhat changed light curve.

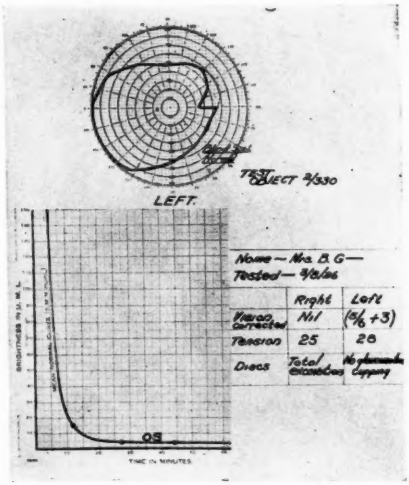


PLATE 8. Case of early glaucoma in which the light minimum was unchanged.

ILLUSTRATING ARTICLE OF DR. GEORGE S. DERBY, DR. J. HERBERT WAITE, AND MR. E. B. KIRK, "FURTHER STUDIES ON LIGHT SENSE IN EARLY GLAUCOMA."

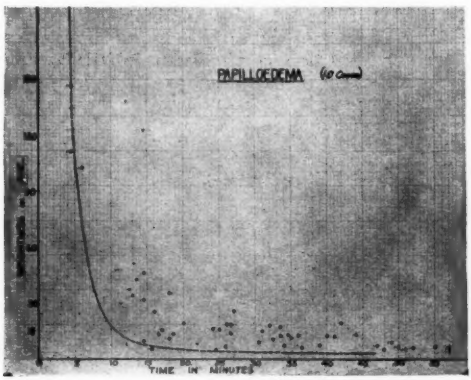


PLATE 9. Light curve in early papilledema.

During the past year, beside the examination of established glaucomas and many other conditions, and the retesting of our last year's series, we were able to test thirty-two more cases which we term preglaucoma,—cases in which there was established glaucoma in one eye, and yet in which the second eye showed as yet no indications of the disease by any of the usual tests.

The next chart shows the thirty-nine cases of last year and the thirty-two of this year, two series that seem to be fairly alike in results.

Plate number 4 shows the original thirty-nine preglaucoma cases and twenty-eight of the same cases tested approximately a year later. A few of these cases have now developed a definite glaucoma, and in general it can be seen from the records of a year ago and those of this year, that the light minimum has risen during the year, even though many still show no other signs of the disease.

We would also like to show a few individual charts which illustrate the work perhaps better than do the charts of a group of cases.

Plate 5 shows a sample of a so-called preglaucomatous ("normal") eye. A.B. Four years previously she had had a rise of tension in her left eye, and had been kept under pilocarpine since that time. The field showed a small nasal step and a slightly increased blind spot, the vision was $\frac{20}{40}-$ due to a slight lenticular haze, the nerve head showed a marked glaucomatous cup. The tension under pilocarpine ranged from 17*mm* (Schiötz) to 20*mm*. The light curve was too high to plot on our chart. The right eye was absolutely normal to all our tests save the light test. The nerve head was normal. Tension 15*mm* to 18*mm*. The light curve showed a definite change.

Plate 6 illustrates the light curve of a man in the fifties, L.A., who came to one of the writers with a well-marked chronic simple glaucoma of the right eye. He had a large nævus in the right temporal region which affected the right upper lid, and there were a number of dilated conjunctival and scleral vessels on the temporal side of the eye. The field, tension and vision are shown on the chart. The light curve in this eye was high. The left eye was normal in every re-

spect and showed a normal light curve. It seems probable that the glaucoma was induced by the vascular nævus, and that the left eye will never develop it. A number of cases of glaucoma of this nature may be found in the literature.

The patient W. K. R. illustrated by Plate 7 was seen by one of us in September, 1925. His right eye was normal in every way. In October he began seeing haloes with this eye, and his local doctor found a tension of 40*mm* (Schiötz). In February, 1926, he came to us again with a history of seeing haloes for eight days with this eye. He had a mild attack of congestive glaucoma. The vision was somewhat lowered, the tension was 47*mm* (Schiötz). His light minimum was raised as the chart shows. He was sent to the hospital and an iridectomy performed. On March first his tension was 20*mm*. Vision $\frac{20}{15}$, cornea clear, fundus normal, no cupping of the nerve, and the light curve approached the normal level.

B. G., forty years old, was seen in 1913 with no vision in the right eye and a tension of 60*mm* (Schiötz). The left eye, which is the one we are concerned with, showed absolutely no sign of glaucoma except a tension of 40*mm*. Under pilocarpine the tension was reduced to within normal limits. The right eye was trephined and has remained quiet ever since. The use by the patient of a drop of atropine in the left eye produced a mild attack of acute glaucoma, which yielded to miotics. In 1916 the tension rose again in spite of miotics, and an iridectomy was performed. Since then she has been under observation and has shown some slight signs of glaucoma, occasionally the tension has approached the top of the normal limit, and at times we can get the nasal step pictured in the plate, and the nerve head is somewhat concave on the temporal side. The light test is unchanged. This merely goes to show that no one test is infallible, and this case is one of our few exceptions.

During the year we have made light tests in a large number of different diseases,—pernicious and secondary anæmia, leukæmia, jaundice, retrobulbar neuritis, macular changes, retinitis pigmentosa and atrophy of the optic nerve, but in none of these conditions have we enough cases to warrant a report. We have, however, ten cases of papilledema, most of them in a fairly early stage, in which the light minimum appeared to be slightly raised above the normal. Another year we hope to be able to offer the results of further work.

Seven cases of albinism have been examined, in which no material alteration of the light minimum could be made out.

We realize that, as we stated last year, these results must be regarded as only suggestive until the examination of a very large series of cases has confirmed them, and we expect to continue these tests until a sufficiently large number of cases have been examined either to confirm our results or to disprove them. At the present stage of this research it is our distinct impression that an examination of the light minimum by the methods described is of real value to us in making the diagnosis of early glaucoma, and we feel more certain of our ground in evaluating the results of this test than we did a year ago.

It is quite possible that some simple apparatus, perhaps something along the line of the glasses described by Tscherning, will be found to give a perfectly satisfactory result, and will make the examination of the light minimum possible even in the private office. It is also possible that an examination of the light difference, if carried on at a higher level of illumination than that which we have at our disposal in the apparatus we are using, will furnish a valuable test in the early diagnosis of glaucoma. This is one of the problems that we hope to be able to investigate in the future.

REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. THOMAS HAYES CURTIN, Secretary.

MEETING OF APRIL 15TH, 1926. DR. CLYDE E. McDANNALD, CHAIRMAN.

This was a joint meeting with the section on Neurology.

Dr. Charles A. Elsberg read the first paper of the evening entitled, **Some Remarks on Headache with Special Reference to the Headache of Intracranial Disease.** The speaker treated the subject under the following headings: The nerves in the dura, and the lack of sensibility of that membrane. The absence of headache when the dural sac is distended or the dura is stretched during cranial operations under local anæsthesia. Changes in intraventricular pressure and their relation to the headache of intracranial disease. The possible relation of the optic thalamus to headache. Conclusions.

Discussion: Dr. G. E. de Schweinitz, Philadelphia (by invitation), referred to Sir John Parson's statement, contained in his Bowman Lecture (1925), that he regarded "the pain of headache as typically protopathic and thalamic in origin,"—a statement which appeared to be in accordance with the views expressed by Dr. Elsberg. Referring to the so-called "distinctive features" of the headache of intracranial neoplasm, he pointed out that they were sometimes closely simulated by head-pains of other origin, for example, those associated with cyclic vomiting in children, due to autointoxication, those occasioned by some of the types of lethargic encephalitis with choked disk, and those uncommon cases of astigmatism with so-called "spurious optic neuritis," present-

ing also mental disturbances analogous to those caused by frontal tumor.

Dr. Ward A. Holden read the second paper of the evening entitled **Remarks on Papilledema and Papillitis.** In the interest of a simple and more comprehensible nomenclature, ophthalmologists now agree to call simple edema of the optic papilla papilledema, and active inflammation of the papilla papillitis. Papillitis is usually an inflammation of the papilla and the neighboring portion of the optic nerve. An inflammation further back in the optic nerve—a retrobulbar neuritis—usually has the same causation and produces the same visual disturbances as papillitis while the papilla may retain its normal ophthalmoscopic appearance.

Papilledema is due to blocking of the channels of exit of the ventricular fluid leading to increased pressure of the fluid in the subdural spaces of the brain, spinal cord and optic nerves. When the diagnosis is made the patient should be put under the care of the neurologist and the brain surgeon. The ophthalmologist's function thereafter is merely to advise as to the changes in the optic disk and in the vision.

Papillitis, often unilateral, is due to orbital inflammations, poisons, acute infectious diseases, nasal sinusitis and multiple sclerosis. The greatest difficulty lies in deciding what cases are due to sinusitis and what to multiple sclerosis. If retained secretion is found in the ethmoidal sinuses this may be assumed to be the cause, and exenteration of the ethmoids is indicated, if milder methods fail to secure proper drainage. When a central scotoma is accompanied by disturbances in the abdominal reflexes or by ankle clonus and the Babinski sign, the diagnosis of multiple sclerosis is justified. However, it has become the fashion to exenterate the ethmoids even when there is no suppuration, and a great many patients with multiple sclerosis have undergone needless ethmoid operations, which with some frequency have been followed by meningitis.

Encroachment upon the optic foramen by periosteal thickening and by thickening or distortion of the bone may cause various optic nerve affections. Recent improvements in obtaining radiograms of the optic foramen and increased skill in interpreting them are giving this method of examination

considerable value in the study of optic-nerve affections in general.

Discussion: Dr. G. E. de Schweinitz characterized Dr. Holden's paper on papilledema and papillitis as an admirable exposition of this subject. As a method of differential diagnosis, he quoted Koeppe's opinion that the anterior vitreous is normal in the early stages of choked disk, while in optic neuritis whitish, sharply-defined lymphocytic flakes are visible, and that in incipient choked disk the papillary structure is visible, but in inflammatory optic neuritis it is clouded or obliterated. He referred to perimetric studies of the blind spot as a method of differentiating spurious optic neuritis, the early stages of choked disk, and those of optic neuritis.

Dr. Walter D. Sheldon, Mayo Clinic (by invitation), read a paper entitled **The Diagnostic Significance of Visual Field Changes in the Localization of Brain Tumor.** The speaker chose fourteen cases of proven brain tumor so located that the visual pathways had been damaged. In these cases the impairment of visual fields has been one of the chief diagnostic signs. The cases are distributed along the visual pathways in the following manner: Occipital 2; right temporal 2; left temporal 3; basal ganglia 3; chiasmal 2; frontal 2. Five of the cases came to necropsy. Photographs of the gross specimen give evidence of the invasion of the visual pathways by the tumor.

An effort was made to select cases which show some of the many variations in the visual fields produced by a slowly developing brain tumor. The complete homonymous hemianopsia seems to be the rule in lesions involving the optic tract. Lesions from the external geniculate ganglion to the occipital lobe exhibit numerous variations in the fields for both form and colors. Field changes are very uncommon in frontal lobe tumors. One of the cases is quite like that described by Dr. Foster Kennedy. One case of bilateral frontal lobe tumor producing the ophthalmoscopic picture of an optic neuritis with bilateral central scotomata is quite unique in our experience.

Discussion: Dr. G. E. de Schweinitz, referring to the visual field as a means of diagnosing intracranial lesions emphasized the paramount importance of quantitative per-

imetry, without which results could not be really satisfactorily obtained. He illustrated his remarks by describing the homonymous hemianopsia of temporal lobe tumor, and those of extrasellar neoplasm the methods of analyzing scotomatas, and the evolution of the stages of bitemporal hemianopsias caused by interference with the chiasmal cross-roads.

Dr. FOSTER KENNEDY felt that the theory just advanced that headache might be due to pressure on the optic thalamus should not be quickly accepted in view of the absence of all signs and symptoms known to be caused by such pressure. He discussed the diagnostic value of quadrantic defects in the visual fields due to implications of Meyer's loop, and also the occurrence of retrobulbar neuritis on the side of the lesion in frontal tumors with papilledema in the opposite eye.

MEETING OF MAY 17TH, 1926. DR. CLYDE E. McDANNALD, CHAIRMAN.

Dr. ARNOLD KNAPP presented a case of **Bullous Keratitis with Remarks on Treatment** (published in this issue).

DISCUSSION: Dr. P. CHALMERS JAMISON said that he had treated a case along somewhat similar lines to the one treated by Dr. Knapp, and found that the result was successful. He thought that this observation threw a new light on a very obscure process and was a distinct contribution to the treatment of bullous keratitis.

Dr. H. H. TYSON presented a case of **Traumatic Arterio-Venous Aneurism in the Cavernous Sinus.** The patient, J. P., aged 30 years, was shown before this section at the January meeting. He presented him again tonight as a follow-up case showing the result after the ligation of the left common carotid artery in two stages by Dr. Charles H. Peck at the Roosevelt Hospital. A brief description of the method followed by Dr. Peck may be of interest.

Date March 4, 1926. Anæsthetic—Novocaine analgesia locally. Left common carotid artery exposed. Band of fascia lata taken from the left thigh (also under local novocaine analgesia); strip of fascia passed around artery about one inch below its bifurcation. Diameter of artery measured before constriction 0.39 inch. Fascial strip, doubled lengthwise, was then brought about the artery and secured

with fine chromic stitches, constricting the vessel until the external diameter was 0.18 inch; it was estimated that this reduced the cross section area at this point by more than 80%. Patient was relieved of the bruit and had no unfavorable symptoms during the procedure. Closure of wound with catgut and silk, no drainage. Time consumed 20 munutes. Condition good. Examination with exophthalmometer, one week later, showed that the proptosis of the left eye had been reduced by *3mm*, leaving still a difference of *2mm* more in the left.

March 25, 1926, three weeks after first operation, the second stage operation was performed by Dr. Peck. Novocaine analgesia, carotid artery exposed just below the site of partial ligation. It measures 0.38 inch, the same as at former operation. The site of partial constriction was buried in firm cicatricial tissue. An attempt was made to clear the artery through this mass of tissue, but it was unsuccessful. Two heavy silk sutures were placed on the main vessel just below the site of the former partial constriction. Patient bore the operation well and had hardly any pain. Wound closed with catgut and silk, no drainage. Left hospital April 3rd. As a result of the second operation, the exophthalmometer shows at present only about one half *mm* difference between the two eyes, the left being slightly more prominent. All noises in head and bruit practically ceased, only an occasional very slight puff of blowing noticed when lying down. He also experiences an occasional attack of vertigo or confusion when lying on back or upon stooping. Vision $\frac{20}{20}$ – each eye. Fields n., blind spots n. Venous engorgement of retinal and conjunctival veins persists with narrow contracted retinal arteries. Slight crossed vertical diplopia can be produced in extreme upper and lower fields at times due to paresis of third nerve (partial).

The result I consider very satisfactory and should encourage others to use the two stage operation as tending to a better prognosis with satisfactory results, as the two stage ligation tends to avert late cerebral softening.

Discussion: Dr. Knapp thought that Dr. Tyson was very fortunate in getting $\frac{20}{20}$ vision in each eye.

Dr. Ben Witt Key reported a case which had been pre-

viously shown at this section in which the ophthalmic veins were ligated, the bruit was abolished and the proptosis relieved. Atrophy of the nerve however was present.

Dr. H. H. TYSON also presented a case of **Crater-like Cavities in the Optic Disks** and stated that according to the Encyclopedia of Ophthalmology "Crater-like cavities in the optic nerve head were very rarely reported." He thought that the following case might be of interest.

H. H., aged 77 years, presented herself at the Knapp Eye Hospital on February 24, 1925, and gave a history of having had poor vision for at least the past fifteen years. R. $\frac{20}{24}$, L. $\frac{5}{200}$. O. D. Field and tension normal. Crater-like holes in temporal third of optic disk. O. S. crater-like hole oval in shape, longest diameter horizontal, in superior third of optic disk—central choroiditis.

In the right eye the crater was oval in shape with greatest diameter vertical, and located in the temporal side of the disk—the sides of the crater were very abrupt, especially on the temporal side, and it required −9 D to see the floor of the crater, where two small additional pigmented holes could be seen. In the left disk the depth of the crater was between 9 and 10 D but on account of opacities in the lens and vitreous, details were blurred and indistinct. The reflex from the floor of the large crater-like hole was of a slatey blue color, while from the nasal part of the disk a dense white thin veil of connective tissue extended from the edge of the crater to the nasal end of the disk. The holes are supposed never to occur in the disk above the horizontal meridian, this case being an exception to the rule.

Dr. MARTIN COHEN presented a case of **Unilateral Exophthalmos Occurring in a Child.** Colored boy 4½ years old. One evening the child's eye was markedly protruded. Two weeks later the child came to the Dispensary showing an exophthalmos which has gradually increased. There was no evidence of a hemorrhage either of the eyeball or lid. The eyeball protrudes forward and upward, motility limited below and outward. Palpation of the eyeball encounters a doughy resistance. The exophthalmometer gave a reading of 33 in the right eye and 22 in the left eye. Pupil dilated and reacted sluggishly to light. The fundus examination was normal.

From the history, we thought of a subperiosteal hemorrhage producing a subperiosteal encapsulated hematoma in the neighborhood of the lower and outer orbital plate. No bruit was heard over eyeball.

The general examination was normal, except for plus four Wassermann reaction. The mother's Wassermann was also plus four. The father has tuberculosis. X-ray examination of the orbit was negative. Chest X-ray was suspicious of tuberculosis.

The treatment has been for a hemorrhage occurring in a congenital luetic or a possible hemophilic. The child has therefore been given orange juice, and antiluetic treatment.

We have not used the aspirating needle. Another X-ray examination for evidence of any subperiosteal fibrous tissue formation will be made later. If the exophthalmos does not improve under treatment, a Kroenlein operation will be performed.

DISCUSSION: Dr. KNAPP thought that Dr. COHEN should proceed with this treatment. There should be no hurry about operating as the results in sarcoma of the orbit in children are very uncertain.

Dr. COHEN presented a case of **Large Scleral Rupture of the Eyeball due to a Stab Wound,** in a man aged 35.

There was a complete linear rupture of the entire upper and lower lids, and of the conjunctiva and sclera; the latter was located about 4*mm* from the limbus on the nasal side, and was about an inch in length. The vision was nil and the anterior chamber was filled with blood. The eye was collapsed and showed a large prolapse of vitreous at the site of the wound. The sclera and conjunctiva were sutured carefully and healing was uneventful. The vision in this eye is now $\frac{20}{70}$, field and tension normal. There is evidence of an old hemorrhage in the retina, also bands of connective tissue in the periphery of retina opposite the site of the scleral rupture.

A case of **Traumatic Hole in the Macula Following Gunshot Wound** was presented by Dr. COHEN. Colored woman age 30 years, was shot with a repeating revolver in the head five months ago. After the shooting she was struck on the head with a hammer. X-ray examination:—Several large

and small metallic bodies, probably lead, are situated in the skull and orbit. Two of the metallic foreign bodies are in the left orbit situated about 1.5*cm* in front of the optic canal and slightly below; five are in the scalp in the right occipital region. There is no foreign body within the cranial cavity. The eye examination at the time showed a marked ecchymosis of the upper left lid and ocular conjunctiva. The pupil was moderately dilated, and reacted sluggishly to light. Fundus details were not recognized, owing to the vitreous hemorrhage. Vision equaled fingers at 6 in. After several weeks, the vision improved slightly so that we were able to recognize a distinct hole in the macula. Vision at present is $\frac{20}{50}$, eccentrically.

Dr. COHEN presented a case of a colored man 34 years of age who complained of **Sudden Loss of Sight** in his right eye. This patient gave a history of having an initial lesion some ten years ago. He has been under antiluetic treatment; Wassermann positive, urine negative. Blood pressure 230 over 160. Vision in right eye is nil, tension and motility normal. Fundus examination—the disk is white, margin indistinct, arteries contracted and show evidence of endarteritis, periarteritis and venous compression. Near the nasal border of the disk a circular whitish patch is present, the result of a deep retinal hemorrhage. The typical cherry red spot is seen in the macular area.

The vision of the left eye is normal. Several linear hemorrhages are noted near the temporal margin of the disk; also indications of venous compression, due to arteriosclerosis. The loss of vision in the right eye is due to a sudden occlusion of the central artery, probably due to a specific endarteritis. Deep compression and a paracentesis were performed without avail. Patient at present under energetic antiluetic treatment.

Dr. S. A. AGATSON presented a number of cases **Illustrating the Ultimate Value of Recession Operations**. The operation of recession of the internal rectus has been done by quite a number of surgeons during the past three years with varied success. I have been partial to that operation and have resorted to it as often as possible. I feel that I have learned something from its results and the reasons for its success in

most cases and failure in a few. Failure to obtain any result can only be the outcome of faulty technique. Thus, incomplete tenotomy before recession, would make the operation as unsatisfactory as partial tenotomy, whereas overcorrection would follow too much recession, either by intention, or accidentally in the process of tying the ligature too loosely. Too much recession results in the loss of power of the internal rectus in adduction and convergence. The reason that I prefer my own method of anchoring the muscle with one ligature is that it is more elastic. I have finally decided that it is safest to recede too little, rather than too much. I use the No. 6 twisted suture, and after tying the first double twist knot I have the patient turn his eye toward the operated side to test the amount of muscle action. If I find that the action of the muscle is too great, I allow the muscle to slide back until the action is such as to bring the limbus just tangent to the caruncle. If the action of the muscle is less than that, permanent loss of power is sure to result. Following this guide, I have obtained satisfactory results. It is better to undercorrect slightly, as patients who have had a recession done on the internal rectus seem after a lapse of time to gain strength in the external rectus. It is not uncommon to see an overcorrection following any muscle operation in patients, who had been operated several years ago, and whose eyes were straight immediately after the operation. This is more apt to occur with only a slight refractive error of hyperopia or patients with myopia. It is well to leave eyes 5 to 10 prism degrees undercorrected. Any error greater than that remaining after the recession operation must be corrected by an operation on the external rectus. It is best to operate on the internal rectus first, as shortening the external rectus might make it difficult to test the action of the internal rectus after recession. When there is a decided insufficiency of divergence, resection of the external rectus is the more important operation, and should be done first with or without recession depending on the degree of error.

Discussion: Dr. Jamieson said that he felt that Dr. Agatson's operation was no improvement on the original operation. He stated that he believed the recession operation had come to stay; and that it is an operation of precision,

as is the operation of advancement. He felt also that the capsule entered more into the condition than we realize.

Dr. WHITE stated that he had done a few cases of recession operations with very favorable results. However, we must know the type of case to use this operation upon. It has a place in the field of ophthalmic surgery.

Dr. CURTIN asked Dr. Agatson in what class of cases, with particular reference to convergent excess or divergent insufficiency, is this operation applicable.

Dr. MCDANNALD asked at what age Dr. Agatson would use the operation; and also in what degrees of hyperopia would he do a recession operation.

Dr. AGATSON in conclusion stated that he believed that cases of convergent excess were the best cases for the application of this operation; and also cases of alternating squint. In regard to high errors of refraction, he felt that correction cannot be done by recession operations alone. Amblyopic eyes are no contraindication to operation. The operation can be done from three years up.

Dr. WALTER B. WEIDLER presented a case of **Sarcoma of Orbit in Child**, nine months old. He first saw the patient February 23d, and found a smooth rounded mass at the upper inner margin of the orbit about the size of a hazel nut. There was a smooth mass on the lower inner part of the orbit which extended outward. These masses were smooth and slightly lobulated and round, appeared to be in front of the septum orbitale and not deep in the orbital cavity. A month later the mass had enlarged greatly and the lobulation of the growth was much more pronounced, suggesting a tumor. On March 18th, operation was performed for complete removal, making two large free incisions in upper and lower lids and a careful dissection done to remove growth in capsule. The repair and healing was uneventful. The microscopic examination of the specimen shows it to be a small round-cell sarcoma. The child was referred for radium treatment.

Dr. A. H. THOMASSON read a paper on the **Use of Tetanus Antitoxin in the Prevention and Treatment of Sympathetic Ophthalmia** in which he reported three cases of the disease treated successfully by this method. He thinks that the routine use of this serum in wounds during the late war

explains the infrequency with which sympathetic ophthalmia was met. He used it as a prophylactic in all intraocular wounds, and thinks that it tends to lessen the intensity of the resulting inflammation in the injured eye, and to prevent the development of sympathetic ophthalmia.

DISCUSSION: Dr. H. H. TYSON stated that in 1919, Dr. Thomasson in discussing a paper which Dr. Tyson presented before the Westchester Medical Society, reported his observations and results of his experience with tetanus antitoxin in sympathetic conditions. At that time, Dr. Tyson had the privilege of examining two of his cases which resulted very favorably. He was pleased to know that Dr. Thomasson continued to get favorable results as it added another therapeutic measure in combating this distressing condition.

Dr. BEN WITT KEY stated that tetanus serum was one of the specific non-protein serums. He said that various serums were used; and quoted Dr. VERHOEFF who in sympathetic ophthalmia had been using diphtheritic serum, given in massive doses of 20,000 units over a period of a month.

Dr. CLYDE E. MCDANNALD presented a case of **Powdered Gold in Both Corneæ.** History of a man mixing two parts of nitric acid and one part hydrochloric acid combined with 18 karat gold. This was allowed to dry in an oven and while stirring the dried particles with a steel spatula an explosion occurred. When the man was first seen, the gold was embedded in the conjunctiva and cornea. With a tooth-pick with cotton, Dr. MCDANNALD was able to wipe away the particles on the conjunctiva, but not those from the cornea as they were too deeply embedded in the corneal layers. Very little reaction followed. Particles still can be seen embedded in the cornea. Vision in both eyes $\frac{10}{15}$.

A case of **Adenoma of the Pituitary after Operation** was presented by Dr. MCDANNALD. Colored boy, 28 years of age. Vision $\frac{20}{200}$ R. E. and $\frac{20}{100}$ L. E., complained that he could not see people directly in front of him. He also complained of frontal headache. The X-ray report showed adenoma. Dr. Ney operated and removed an adenomatous growth of the entire pituitary body under local anæsthesia. Today his vision is $\frac{10}{20}$ both eyes.

REPORT OF THE OXFORD OPHTHALMOLOGICAL CONGRESS.

By Mr. BERNARD CRIDLAND, Honorary Secretary.

Under the Mastership of Mr. Philip H. Adams, recently elected in succession to the late Sir Anderson Critchett, Bart., K.C.V.O., the sixteenth meeting of the Oxford Ophthalmological Congress took place at Oxford on July 14th, 15th, 16th and 17th.

No meeting was held last year, owing to the Convention of English-speaking Ophthalmological Societies, but with this exception the Congress has met annually since its inception in 1910.

The membership, which in that year was 181, has steadily increased to 380 at the present time.

As in past years the proceedings took place in the Department of Human Anatomy through the kindness of Professor Arthur Thomson, M.A., M.B., etc., and members were again indebted to Keble College for hospitality. The Congress was opened on the 15th by a short address of welcome by the Master followed immediately by a discussion on sympathetic ophthalmia. The opener, Mr. Malcolm Hepburn, began by outlining the history of the treatment of the condition during the past fifty years and comparing this with present-day methods.

With the dread of sympathetic ophthalmia occurring, even many years after the injury, probably many eyes have been excised in the past which might have proved useful. The general trend of opinion now, however, was against the likelihood of sympathetic trouble appearing after a lapse of years and it was to those cases of cyclitis developing within a few months after the exciting cause that he directed attention.

Not all such cases are of the nature of sympathetic ophthalmia and some scientific method should be aimed at whereby a cyclitis of sympathetic origin can be differentiated from one due to other causes.

The opener suggested that not all eyes which manifest keratitis punctata even though of sympathetic origin should be excised and that many eyes with keratitis punctata following injury or operation should be operated on for the relief of such symptoms.

In quoting cases in support of this statement, he further emphasized the value of the differential blood count.

The finding of a large excess in percentage of the large mononuclear cells with decrease in the polymorphonuclears is a valuable guide in deciding the line of treatment to be taken.

Mr. S. H. BROWNING presented the bacteriological side of the subject dealing chiefly with the question of the differential blood count. Cases were quoted in which a change in the blood count determined the line of treatment to be followed.

Treatment by arsenic preparations of the "606" type was dealt with and mention made of anaphylaxis and the anaphylactic theory of the disease.

Dr. G. E. DE SCHWEINITZ (Philadelphia) followed with a special reference to the work recently done by Verhoeff and presented at the last meeting of the American Ophthalmological Society.

Seven cases of sympathetic uveitis were treated by him by frequent subcutaneous or intramuscular injections of diphtheria antotixin in large doses. In four out of the seven a remarkable improvement in vision was obtained but the effectiveness of the treatment was most striking in causing a rapid subsidence of the inflammatory condition.

Dr. de Schweinitz expressed himself as being in agreement with Mr. Browning's views.

Dr. HARRISON BUTLER pointed out the value of the slit-lamp in detecting the earliest signs of the disease and mentioned illustrative cases.

Mr. RUSS WOOD described two cases in which the reaction to tuberculin tests was positive in each.

Prof. EMILE DE GROSZ (Budapest) stated that in the past

fifty years 150 cases of sympathetic ophthalmia had been treated at the No. 1 Eye Hospital at Budapest, making .28% of the total patients seen. 10% of these had followed operations, most of which had been performed elsewhere.

In his view repeated operations on injured eyes increased the risk of sympathetic trouble.

He was convinced that the inflammation was metastatic in nature.

Lt.-Col. H. HERBERT referred to the iris-inclusion operation for glaucoma and the supposed risk of sympathetic ophthalmia.

Mr. J. GRAY CLEGG spoke on the occurrence of the trouble after evisceration.

Lt.-Col. A. E. J. LISTER commented on the rarity of the disease in hot dry climates.

The following also took part:—Mr. A. F. MacCallan, Mr. A. Greene, Dr. Arnold Verrey, Mr. T. C. Summers, Mr. R. J. Coulter, Mr. N. C. Ridley, Mr. A. Zorab, and the Master.

Mr. *Hepburn* and Mr. *Browning* replied.

The afternoon was given up to demonstrations in the Scientific Museum as follows:—Lt.-Col. H. HERBERT demonstrated an iris-inclusion operation for glaucoma, Dr. G. YOUNG showed statistics on Ophthalmometry, Lt.-Col. A. E. J. LISTER presented tables showing the weights of 180 cataractous lenses with details as to patients' weights, age, blood pressure, etc.

Dr. THOMSON HENDERSON showed microscopical specimens of the ciliary region in mammalia and demonstrated his apparatus showing the mechanism of accommodation.

Mr. TOMLINSON demonstrated his light-sense test for the light-adapted eye.

Lt.-Col. W. V. COPPINGER showed (a) a prothesis of crude Indian manufacture which had cut through the lid of the wearer and (b) prints of the plans of the new Calcutta Eye Hospital.

Dr. BURDON-COOPER demonstrated Pulfrich's phenomenon and brought forward evidence that the explanation was one connected with accommodation rather than with dark-adaptation. In an adjoining room the most recent ophthalmic apparatus and instruments were on exhibit by a number of well-known firms.

On Friday morning papers were read by Dr. G. YOUNG on (a) Can an amblyopic eye recover good vision? and (b) A suggestion as to the cause of the invisibility of the retinal vessels and explanation of Purkinje's phenomenon. The former referred to the case of a man of 60 with an amblyopic eye associated with internal strabismus who had lost the vision of the good eye from embolism; the vision of the amblyopic eye improved in a year from less than $\frac{6}{60}$ths to $\frac{6}{9}$ths.

Dr. MARION GILCHRIST presented some interesting medico-legal cases which had time permitted would have invoked much discussion.

The Doyne Memorial Lecture was delivered by Dr. THOMSON HENDERSON of Nottingham who had chosen as his subject "The Anatomy and Physiology of Accommodation in Mammalia."

Admirably presented in every way the lecture was followed with the greatest interest.

Some original and interesting theories on the physiology of accommodation were put forward whilst the anatomy of the ciliary region was shown in a valuable series of slides and drawings from various mammalia including man.

Dr. Henderson was warmly congratulated upon his effort and received at the conclusion of his lecture the Doyne Memorial Medal for the year.

In the afternoon Lt.-Col. H. SMITH, C.I.E., presented a review of the various methods of performing intracapsular extraction of cataract and described in detail his own latest method of expression, the outcome of his work during the past winter in India.

The paper was discussed by Lt.-Cols. Lister and Coppinger, Messrs. Zorab, Harrison Butler, Walker, Coulter and Jaques.

On the morning of Saturday Dr. T. S. GOOD, O.B.E., Medical Superintendent of the Oxford City and County Mental Hospital, read a paper entitled "Psychology and the Eye," in which he gave details of cases where the relief of trouble caused by refraction error had had a marked effect in clearing up mental disturbances and of other cases in which no result was obtained, although eye symptoms were prominent in these but without abnormality in the eyes themselves. Many interesting points were touched on with regard to men-

tal disturbance and sight. This suggestive paper will well deserve reading in the original.

Dr. HARRISON BUTLER followed with an instructive paper on the signs of inflammation in the eye when examined by the slit-lamp.

The proceedings of the meeting concluded with a paper by Dr. MARGARET DOBSON on the macular region as seen by red-free light. Some extremely interesting drawings of the appearance presented by the macula in both normal and diseased conditions were shown and revealed changes which could not be easily detected by other means.

The Annual General Meeting was held after the morning session on the 15th, when the Council reported that 27 new members had been elected in the past two years, making a total membership of 380, that the attendance at the 1924 meeting was 101, that members and associate-members of the Convention of English-speaking Societies last year had been entertained at Oxford by the Congress and that the financial position was satisfactory.

The Council regretted to report the loss through death of the following:—Sir Anderson Critchett, Bart., K.C.V.O. (Master 1924–1925); Edmund Landolt (Paris); Henri Coppez (Brussels); S. Lewis Ziegler (Philadelphia), member of Council from 1911; J. B. Story (Dublin); S. Johnson Taylor (Norwich), member of Council 1917–1923; Percy Bardsley (Salisbury); C. F. Harford (London); J. L. Meynell (Manchester).

The Annual Dinner took place on the evening of July 15th in Keble College, amongst the guests being Professor Sir Archibald Garrod, K.C.M.G., and Professor J. A. Gunn.

The Congress was well attended, oversea members being represented by Dr. G. E. de Schweinitz, Professor Emile de Grosz (Budapest) and Dr. Arnold Verrey (Lausanne) amongst others.

REPORT OF THE TRANSACTIONS OF THE OPHTHALMOLOGICAL SECTION OF THE ROYAL SOCIETY OF MEDICINE.

By MR. H. DICKINSON, London.

An ordinary meeting of the Section took place on Friday, 11th June, under the presidency of Sir Arnold Lawson, K.B.E.

Clinical Cases.

Mr. J. Cole Marshall showed three male patients who were the subjects of what he took to be **atrophic choroiditis,** probably of the familial type, as two were brothers and the third was a first cousin. The mother of the two brothers had bad sight, but that was said to be due to early cataract. The elder of the two brothers was aged 23, and his vision was now rapidly becoming worse, the nerve showing waxy atrophy. Between the areas of atrophy there was increased pigmentation, there were corpuscular cells in the lens, and vitreous opacities. Two years ago there was a small hemorrhage on the front of one disk, but it soon cleared up.

The youngest of the three was aged 19, a myopic boy with poor vision. The nerve did not appear to have been affected. There were opacities in the lens, and in this case there was more pigment between the areas of atrophy. There were also patches of choroiditis, which appeared to be active. One of the patients had, when a boy, interstitial keratitis, for which he was brought to Moorfield. The young brother evidently had mild encephalitis lethargica, and his family doctor considered he had a specific lesion. None of the cases had night-blindness.

A Case for Diagnosis.

MR. J. D. M. CARDELL showed a man, aged 50, a painter by trade, who complained that his sight gave him trouble three years ago, since which date his vision had gradually been getting worse. Now he could only count fingers at 1 meter with the right eye, at ¾ of a meter with the left. A white plaque could be seen about the disk in each eye, and each eye also showed a hemorrhage in the region of the macula. The question was whether the plaque was of exudative or hemorrhagic origin. The choroidal vessels were atrophied.

The case was not discussed.

Bilateral Angioma of the Retina.

MR. R. LINDSAY REA exhibited a patient, a young girl, who had had central choroiditis in the right eye, and when this had cleared up, some large vessels could be seen, running upward and outward. At the periphery was a large white area, looking like a retinal detachment, but yet it was more solid-looking and creamy. The fellow eye presented the same appearance. One case of the kind recorded ended in glaucoma. If there had been such a result in this case he would most probably have learned of it.

The Visual Fields in Atheroma of the Retinal Vessels.

MR. RANSOM PICKARD, C. B. (of Exeter), read a carefully prepared paper bearing this title. At the outset he made acknowledgment of the work done on the subject by Mr. Foster Moore. He, the speaker, had noted that in some cases of early atheroma there was a lowering of the central vision to ⅛ or ⅛ when no other cause but the atheroma could be found. His work, begun before he knew of Mr. Foster Moore's researches, was with the object of finding what were the earliest effects of atheroma on the visual field. In order to eliminate confusing factors, he presented only such cases as were free from serious affection of the media, and only such patients as were good observers, with short time reactions, an important point. In that way it could be concluded that the abnormal

fields were due to abnormal vessels. The paper dealt with 29 eyes; in four cases only one eye could be investigated, as the other had been seriously affected by atheroma. Central acuity was recorded as obtained by correcting glasses, and he described his procedure in charting the fields.

The table of results showed that there was no correspondence between the severity of the eye condition and the blood pressure; nor yet between increasing age and the severity of the disease. Hence his classification rested mainly upon the fields, and partly on the ophthalmoscopic differences. Mr. Pickard proceeded to give in detail the features in the three groups into which he divided his cases, according to the fundus alterations. He said that no cases in the series showed a sectoral loss without concentric diminution of the rest of the field.

He found that atheroma in the retinal vessels and in vessels in other parts of the body did not necessarily accompany each other.

With regard to the relation between the fields and the fundus conditions, he said there might be a greater alteration in the lumen of these arteries than their external appearance suggested, or the alterations in the field might be secondary to changes in the main retinal artery. In some cases both these might act simultaneously. The fundus appearances did not always entirely agree with the fields. Neither in general nor in sectoral contraction could one deduce from ophthalmoscopic appearances what the visual field would be. In several of the cases there was a distinct enlargement of the blind spot.

Summary.

In all the cases there was a concentric limitation of the visual fields; in most, there was a general loss of acuity over the whole field, the fixation-point being least affected. In the more advanced cases the region of loss tended to be more irregular, and the margin of the remaining field abrupt. The sectoral nature of the losses in some severe cases made it practically certain that it was due to a blocking of one or more branches of the retinal artery. None of these patients, how-

ever, experienced that difficulty in finding their way about which glaucoma patients with small fields had. He thought a similar change to that in vessels of the eye might occur in the finer vessels of the brain, thus accounting for those alterations of memory and the failure to come up to the former standard of desire and effort to fulfil which the atheromatous patient showed.

Discussion.

Mr. FOSTER MOORE said that a tributary from a vein might be affected without loss of vision, then afterwards there might be central loss, a different matter from a narrowing of an artery. He considered that a general loss was usually due to a hemorrhage in the central retinal artery itself. He had noted that, in taking the fields in homonymous hemianopia, the seeing half was reduced in a concentric manner. In some of the patients there may have been a defect due to cortical involvement.

Mr. ERNEST CLARKE said that the value of the paper would have been enhanced if it had embodied a record of the diastolic pressure, compared with which the systolic pressure had been shown to be of little consequence. It would probably be found that all the cases of the kind described had a low blood pressure; that the blood did not get efficiently to the periphery as it lacked enough "push."

Dr. GORDON HOLMES said he did not consider that the cases Mr. Pickard had described belonged to a homogeneous group. It was very important that in every case showing a central defect of field, the vision should be taken under the same conditions in the two eyes, in order to see whether central lesions were responsible for the defects shown. In some patients the most important factor was the psychological. There were certain patients who could not be relied upon to accurately give the results of graded stimuli, and as a rule it was difficult for people over 60 years of age to do so, as attention through prolonged tests tended to fail. In some of the cases such as Mr. Pickard described there might be a definite perceptual defect due to a central rather than to a peripheral cause. He did not quite approve of the title of the paper,

as admittedly a number of the cases reported on showed no visible change in the retinal vessels. In the case of vessels with normal walls, when the blood pressure was sufficiently high within those walls he thought it might lead to a definite compression or distortion of retinal veins.

Mr. PICKARD, in his reply, said he took all precautions against fatiguing the patients, and only included patients who were good observers. In only one or two was the diastolic pressure taken; in any future series he hoped to make good this defect in the records.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY.

Abstracts by Drs. A. N. Alling, New Haven; P. G. Doyne, London; and K. Wessely (*Archiv für Augenheilkunde*), Würzburg.

Edited by Matthias Lanckton Foster, M.D., F.A.C.S.,
New Rochelle, N. Y.

(*Continued from September issue.*)

II.—REMEDIES, INSTRUMENTS AND OPERATIONS.

27. Barrett. **The vision of railway servants.** *British Journal of Ophthalmology*, vii., 7.

28. Black, Melville. **Intravenous use of sodium salicylates in ocular inflammation.** *American Journal of Ophthalmology*, 1924, p. 773.

29. Cucco. **Osteoma of the orbit removed by means of Cirincione's operation.** *Annali di Ottalmologe. Clinica oculistica*, January, 1923.

30. Derby, George S. **X-ray and radium in the non-malignant diseases of the eye.** *Boston Medical and Surgical Journal*, July 3, 1924.

31. Di Marzio. **Supraciliary orbitotomy for the removal of orbital tumors.** *Annali di Ottalmolog. e Clinica oculistica*, February, 1923.

32. Gold, Harry J. **The seat of the mydriatic action of cocaine.** *Pharmacol. and Exper. Therapeutics*, June, 1924.

33. Gradle, S. Harry. **The use of adrenalin in increasing intraocular tension.** *American Journal of Ophthalmology*, vii., 1924, p. 851.

34. Lane, Laura A. **Radium in ophthalmology.** *Journal A. M. A.*, lxxxiii., p. 1838.

35. Lemoine, Albert N. **The antipneumococcic properties of ethylhydrocuprein hydrochloride (optochin) in vivo.** *American Journal of Ophthalmology*, August, 1925, p. 609.

36. Pischel. **Localization of foreign bodies within the eye by metal markers in the conjunctiva.** *Zeitschrift f. Augenheilkunde*, September, 1923.

37. Sprague, H. B., White, P. D., and Kellogg, J. F. **Disturbances of vision due to digitalis.** *American Journal of Ophthalmology*, September, 1925, p. 716.

38. Speidel, C. C. **The effect of thyroid administration on the eye of the frog tadpole. A possible additional factor in the production of goitrous exophthalmos.** *Journal A. M. A.*, July 12, 1924.

39. TRAUTNER, A. **Total ophthalmoscopy through contact illumination with pressure on the eyeball.** *Revue générale d'Ophtalmologie*, November, 1923.

40. TRISTIANO. **Modification of the operation for canthoplasty.** *Bolletino d'oculist.*, August and September, 1922.

41. TRISTIANO. **Modification of Snellen's forceps.** *Ibid.*, May, 1923.

42. WITHERS, SANFORD. **Value of radiation therapy in ophthalmology.** *American Journal of Ophthalmology*, July, 1924.

BLACK (28, **Intravenous use of sodium salicylate in ocular inflammation**) advises its use in all cases of iritis, scleritis, infection from penetrating wounds and after cataract extraction. He finds that sodium salicylate relieves pain promptly and materially shortens the course of the attack.

ALLING.

DERBY (30, **X-ray and radium in non-malignant diseases of the eye**) reviews the literature and finds that radium and X-ray have a limited use in the non-malignant diseases of the eye. They seem only to be of value in vernal catarrh and extraocular vascular tumors.

ALLING.

GOLD (32, **The seat of the mydriatic action of cocaine**) found ergotoxin constricts the pupil by paralyzing the sympathetic endings in the iris and it constricts the pupil dilated with cocaine; cocaine does not dilate the pupils constricted by ergotoxin, from which he concludes the cocaine mydriasis is not due to paralysis of the circular fibers of the iris, but to an action upon the sympathetic. It also suggests that cocaine does not stimulate the sympathetic endings in the iris but renders them more excitable to stimulation.

ALLING.

GRADLE (33, **The use of adrenalin in increasing intraocular tension**) has had favorable lowering of the tension in secondary glaucoma. He believes that the iris angle is made to function normally either by the fact that adrenalin stimulates the sympathetic system of the eye or by constricting the iris vessels. He suggests that all ophthalmologists use the drug and report the results. ALLING.

LANE (34, **Radium in ophthalmology**) has found radium to be of great value in treating many benign affections of the eye. It gives promise of being a valuable aid in the treatment of

ulcers of the cornea and probably in some affections of the deeper eye structure. Radium offers less scarring and gives a better cosmetic appearance than surgical intervention in many diseases about the eyes. ALLING.

LEMOINE (35, **The antipneumococcic properties of ethylhydrocuprein hydrochloride (optochin) in vivo**) has shown experimentally that a very small quantity of the drug injected into the vitreous destroys the sight of the eye, but will not inhibit the growth of pneumococci in this area. When 0.20*cc* of a 1:100 solution of optochin is injected into the anterior chamber, the physiologic function of the eye is not impaired, but the anterior layers of the iris at site of the injection are discolored. This amount inhibits the growth of pneumococci in the anterior chamber.

ALLING.

SPRAGUE, WHITE, and KELLOGG (37, **Disturbances of vision due to digitalis**) review the literature and report the ocular manifestations in seven cases which they studied. The patients received an excessive amount of digitalis therapeutically. All complained of a decrease of visual acuity, some showed a defect for color sensation, others difficulty in focusing the eyes or reading. Definite scotomata were found in two cases and three had flickering before the eyes. In one instance the patient said that the surrounding objects in the sunlight appeared covered with snow. ALLING.

WITHERS (42, **Value of radiation therapy in ophthalmology**) considers (1) the ocular resistance or susceptibility to radiation; (2) the conditions for which treatment by radiation is the method of choice, and which show characteristics of radio susceptibility to a marked degree; (3) conditions in which radium has proved beneficial though it may not necessarily be the method of choice; (4) conditions in which radium may be used because it causes less trauma; (5) conditions in which radium may be applied experimentally because beneficial in similar conditions in other parts, and (6) radium may be applied as a prophylactic measure to the glands in intraocular melanomas and gliomas, combined with radical exenteration of the orbit, and as a palliative measure in hopeless malignancies. ALLING.

SPEIDEL (38, **The effect of thyroid administration on the eye of the frog tadpole. A possible additional factor in the production of goitrous exophthalmos**) experimentally induced hyperthyroidism in frog larvæ which was accompanied by a marked protrusion of the eyeball. He believes the immediate cause of the protrusion is the rapid growth of the anterior portion of the eyeball. The possibility is suggested that a similar selective action of the thyroid secretion may occur in the exophthalmos of human exophthalmic goiter, and the protrusion of the eyeball may be explained in part as the result of actual growth in size of the anterior portion of the eye, localized especially in the relatively undifferentiated region of the ora serrata. ALLING.

BARRETT (27, **The vision of railway servants**) brings out the fact that the results of testing vision with objects in the open, even though at such a distance that they subtend a visual angle of five minutes, are not equivalent to those obtained with Snellen's test-types, because in testing in the open the background, the atmosphere, and the change of color tones are continuously variable factors.

CUCCO (29, **Osteoma of the orbit removed by means of Cirincione's operation**) thus describes the removal of a mucocele of the ethmoid and an osteoma of the inner, upper wall of the left orbit from a woman 38 years old. The periosteum of the margin of the orbit was laid bare by a circular incision from the nasal end of the brow to the middle of the lower orbital margin. This was then cut through to the bone and dissected up toward the orbit. The periosteum then formed a sac containing the eyeball and all its soft parts which could be retracted from the wall of the orbit without harm. The tumor was thus left exposed and was removed with a few blows of a hammer. The periosteum was then replaced and the circular wound closed with sutures. After the operation the patient had perfect motility of the eye and perfect vision. In a short time the scar became almost invisible.

The same operation seems to be described by DI MARZIO (31, **Supraciliary orbitotomy for removal of orbital tumors**) as preferable to Kroenlein's operation. An incision is made from the nasal end of the brow 1*cm* above and parallel to it as far as its outer end where it curves down and in to the middle of the

lower margin of the bony orbit. The periosteum is then incised and undermined, beginning at the nasal end, with protection of the attachment of the superior oblique and of the orbital parts of the lacrimal gland. The eyeball with all its soft parts becomes thus enclosed in a periosteal sac and can be drawn away from the bone. If the tumor lies in the soft parts the periosteum is split with a blunt instrument and the neoplasm shelled out, the use of all cutting instruments being avoided. If the optic nerve is involved, such a portion of it as may be necessary can be excised. After the periosteal sac has been replaced and the wound closed with sutures a smooth healing usually follows. The mobility of the eyeball is preserved, the exophthalmos is permanently done away with, and in a short time an almost invisible scar alone indicates that an operation has been performed. The writer says that this method has been used in Rome since 1909 on more than fifty patients with the best results. In his statistics he mentions thirty-one cases, six angiomata, ten orbital cysts, three tumors of the lacrimal gland, five osteomata, three tumors of the optic nerve, and four fibrosarcomata. He gives a full description of a cavernous angioma with choked disk, and of a fibromatous sarcoma of the orbit. In both of these the eyeball was preserved with its mobility and the vision was preserved or improved.

In order to avoid the annoyance of hemorrhage during canthoplasty TRISTIANO (40, **Modification of the operation for canthoplasty**) first makes a horizontal skin incision outward from the outer canthus for the desired length of the canthoplasty, without wounding the vascular muscle. Then he dissects up the conjunctiva at the outer canthus from the margin of the lids to the fornix and passes a silk thread through the conjunctiva at the point which formed the apex of the canthus. Now he divides the orbicularis with scissors and fastens the suture at the apex of the skin incision. The hemorrhage causes no annoyance as the operation is practically ended before it begins, and the insertion of the suture aids in its control. Two lateral sutures of the conjunctiva to the skin margins of the wound in the lids completes the operation.

After the eye has been cocainized PISCHEL (36 **Localization of foreign bodies within the eye by metal markers in the con-**

junctiva) needle points about 3*mm* long in the horizontal and vertical meridians of the conjunctiva some 5*mm* outside of and parallel to the limbus. A lateral and a frontal rœntgenogram is then taken, from which the situation of the foreign body can ordinarily be accurately determined while the plate is still wet. The advantage of this is that it may enable one to remove the foreign body early. Sweet's method necessitates a complicated apparatus and takes time, as the calculations must be made from the dry plate, and its trustworthiness depends on the coöperating fixation of the patient. The writer tells of a case in which an expert roentgenologist located the foreign body in the ciliary body when it was really just beneath the conjunctiva.

TRAUTNER (39, **Total ophthalmoscopy through contact illumination with pressure on the eyeball**) is able to bring into view a portion of the anterior third of the fundus, which is commonly invisible, by pressing the curved end of a Lange's lamp upon the desired place on the eyeball. By interposition of the correcting glass one may see the fundus even without an ophthalmoscope and by daylight.

Snellen's forceps, which were devised to provide an ischæmic field for the operation for entropion and trichiasis, often prevents the incision from being carried to the end of the lid, so that the operation has to be completed in bleeding tissues after the forceps have been removed. To do away with this fault TRISTIANO (41, **Modification of Snellen's forceps**) has broadened the fenestrated blade so as to include the canthi.

III.—ANATOMY, PHYSIOLOGY, AND PATHOLOGY.

43. BALDASSARE. **Concerning the effects of adrenalin used hypodermically in vernal catarrh.** *Bolletino d'oculistica*, March, 1923.

44. BEHR. **Parenteral turpentine treatment in eye diseases.** *Muench. mediz. Wochenschrift*, 1923, p. 1116.

45. BESSO AND DAZZI. **Further studies concerning the etiology and pathogenesis of eczematous kerato-conjunctivitis.** *Bolletino d'oculistica*, December, 1922.

46. CARRÈRE. **Method of complement deviation applied to the diagnosis of ocular tuberculosis.** *Revue Générale d'Ophtalmologie*, November, 1923.

47. DENTI. **Milk therapy in ophthalmology.** *Bolletino d'oculistica*, February, 1923.

48. DERKAC, VASILJ. **Bilateral congenital microphthalmos with cyst of orbit.** *American Journal of Ophthalmology*, October, 1925, p. 809.

49. FABRY, JOH. **Congenital and acquired syphilis in childhood.** *Med. Klinik*, 1923, p. 340.

50. GALLENGA. **Removal of the lens in the treatment of congenital hydrophthalmos.** *Bolletino d'oculistica*, October, 1922.

51. GOURFEIN. **The efficacy of salts of bismuth in the treatment of syphilitic ocular affections.** *Revue Générale d'Ophtalmologie*, April, 1923.

52. GRAVES, BASIL. **The visible beam in the aqueous.** *American Journal of Ophthalmology*, January, 1925.

53. HADEN, H. C. **Development of lamina cribrosa.** *Ibid.*, January, 1925.

54. KNIGHT, MARY S. **Melanotic neoplasms of the eye.** *Journal A. M. A.*, lxxxiii., p. 1063.

55. LAWRIE. **Microphthalmia with vertical slit-like pupil, an opacity of the cornea, and remains of pupillary membrane.** *British Journal of Ophthalmology*, May, 1923.

56. LOEWENSTEIN, E. **Tuberculosis immunity and its relations to ophthalmology.** *Zentralbl. f. d. ges. Ophthalmologie*, May, 1923.

57. MEMMESHEIMER AND LUNECKE. **Ocular changes in the early stage of syphilis with positive cerebrospinal fluid.** *Dermat. Zeitschrift*, 1923, p. 213.

58. POYNTER, C. W. M., AND ALLEN, E. V. **Lens antigen as a factor in congenital and hereditary eye anomalies.** *American Journal of Ophthalmology*, March, 1925.

59. REGANATI. **Two cases of faulty development of the lacrimal passages.** *Annales di Ottalmologia e Clinica oculistica*, April-May, 1923.

60. VON ROETTH. **Novatropin in ophthalmology.** *Klinische Wochenschrift*, 1923, p. 517.

61. SCHEERER. **Vascularized congenital cataract with visible circulation and vascular connections with the ciliary body and the tunica vasculosa lentis.** *Klin. Monatsbl. f. Augenheilkunde*, lxx., p. 335.

62. WEYMAN, M. F. **Microphthalmos with cyst formation.** *American Journal of Ophthalmology*, March, 1925.

BALDASSARE (43, **Effects of adrenalin used hypodermically in vernal catarrh**) has tried this treatment in three cases and says that the subjective troubles disappeared after repeated injections of $\frac{1}{4}mg$ of adrenalin, and the objective symptoms showed a marked improvement. He thinks that vernal catarrh like hay fever, may be the expression of an anaphylactic condition. The appearance of eosinophilia in both diseases, and its decrease when substances which stimulate the sympathetic are introduced, leads the author to surmise that a change in the sympathetic is present in both diseases evinced

through an insufficiency of the vasoconstrictors, which is produced by a disturbance of the balance of the endocrine secretions, and especially by a primary or secondary insufficiency of the suprarenal capsules.

BEHR (44, **Parenteral turpentine treatment in eye diseases**) used for subcutaneous or intravascular injection a ten per cent. oily solution of rectified turpentine. The injection is nearly painless and is not followed by fever. The dose ranges from 0.5 to 4*ccm*, in children according to the age from 0.1 to 0.5*ccm*. Two or three injections are usually given weekly. The entire amount used should not exceed 30*ccm*. If no effect is evident after the second or third dose, none is to be expected. On the whole this treatment is more efficient than milk therapy, but frequently one will act when the other will not. The best results were obtained in diseases of the lids, especially in the acute, but also in the chronic forms of eczema, hordeola, and blepharitis ulcerosa. The influence was good in the acute exudative forms of conjunctivitis, particularly the gonorrheal. Blepharospasm usually yields quickly. In scrofulous corneal troubles Behr uses first turpentine, then, if the third injection is without effect, he tries some injections of milk, and, if this fails, undertakes a short treatment with tuberculin. Turpentine is just as useless as milk in ulcus serpens, parenchymatous keratitis, and pannus. Its action is not reliable in iritis, cyclitis, and diseases of the choroid and retina, though functional improvements have been frequently observed after the injection. No effect was produced in three cases of inflammation of the optic nerve.

The dose ordinarily employed by DENTI (47, **Milk therapy in ophthalmology**) is 5*ccm* for adults, 2*ccm* for children. Denti describes fifty cases of various forms of eye diseases thus treated and comes to the following conclusions: The principal effect is confined to the first two injections, and manifests itself mainly in the relief of the subjective symptoms, photophobia, lacrimation, blepharospasm, and pain. Its chief field of action is in inflammations of the anterior segment of the globe, especially in iritis, except when this is of a tuberculous nature. The results are excellent in the early stages of hypopyon keratitis, although of little value in advanced cases. The results are uncertain in all diseases of the posterior segment

of the globe, as well as in the septic forms of uveitis, and are nil in trachoma.

GOURFEIN (51, **Efficacy of salts of bismuth in the treatment of syphilitic ocular affections**) maintains that this sort of treatment is very efficient, is well borne, cures quickly, and usually changes a positive to a negative Wassermann. Serious complications in the part of the optic nerve are not to be feared, and both the danger and the unpleasantness of salvarsan are absent. In his opinion bismuth salts should be used in iritis, iridocyclitis and chorioretinitis when the cause is obscure, Wassermann's reaction is negative, and other treatment fails. Some cases which do not react to salvarsan respond promptly to intramuscular injections of bismuth.

BESSO and DAZZI (45, **Etiology and pathogenesis of eczematous kerato-conjunctivitis**) made a systematic examination of sixty-one cases of this disease. In only three could they find active tuberculosis. In these Besredka's test was positive. Gastro-enteritic disturbances were exclusively present in 52.4%. Pirquet's test was positive in 50%, Besredka's negative in all. In 42.6% a marked exudative diathesis was evidenced by eczema, blepharitis, rhinitis, hypertrophy of the tonsils, and glandular swellings, while the picture of true scrofulosis, shown by softened lymphatic glands, breaking down of the glands, and diseases of the bones and joints, was present in no case. The writers are of the opinion that scrofulosis and tuberculosis are less prominent in the etiology of eczematous kerato-conjunctivitis than the endotoxic gastro-intestinal troubles. In confirmation of this opinion Besso has demonstrated indicanuria in the great majority of cases of this disease.

CARRÈRE (46, **Method of complement deviation applied to the diagnosis of ocular tuberculosis**) found the reaction positive in 80% of the patients who had formerly suffered from a tuberculous affection, in 71% of children with swollen glands, eczema and scrofula, and in only 36% of patients with only ocular symptoms of tuberculosis, in whom a latent tuberculosis may be present, but has not been demonstrated.

LOEWENSTEIN (56, **Tuberculosis immunity and its relations to ophthalmology**) makes the following statements: 1. Tuberculous bacillæmia is not uncommon, even when lesions in the

lung are very small or altogether wanting. 2. In metastatic tuberculosis the pulmonary condition is frequently so slight as to escape the observation of the pathologist. 3. New localizations almost always follow in the path of the first metastasis, that is, remain within the same system of organs. Ocular tuberculosis is bilateral in 80% of the cases. 4. Serious disease of one system of organs protects the other systems of organs from the disease, but slight disease and healed lesions afford no protection to the other systems. 5. This law is completely broken in general military tuberculosis. Extirpation of one tuberculous kidney protects the other in the same way as enucleation in sympathetic ophthalmia protects the eye. Sympathetic troubles are not confined to the eye, but are present in most of the other systems of organs.

FABRY (49, **Congenital and acquired syphilis in childhood**) says that syphilis of both father and mother is the rule in congenital syphilis. Only exceptionally are healthy children born of a mother in the third stage. When secondary symptoms appear in an infant late after birth, it may be that the mother formerly had syphilis and been under treatment. The later the symptoms appear, the better the prognosis for the child. The exanthems in a child develop in a certain direction, contrary to the exanthems of adults. Exanthems with the formation of bullæ are more common. All the internal organs may be affected. Changes in the epiphyses of the bones are prominent. All the exanthems from roseola to condylomata may appear. In youth pemphigus, eroding exanthems and rhagades are common. Intertriginous affections may render the diagnosis difficult. Psoriasis and lichen are more rare. As the children grow older their exanthems more nearly approach those of adults. Acquired syphilis runs about the same course in children as in adults. Well developed condylomata lata and mucous patches in the mouth are almost always present. Specific periphlebitis cannot always be easily distinguished from tuberculous erythema induratum, and the coincidence of syphilis and tuberculosis must always be borne in mind. In late hereditary syphilis diseases of the internal organs and bones take precedence over skin affections.

MEMMESHEIMER and LUNECKE (57, **Ocular changes in the early stage of syphilis with positive cerebrospinal fluid**) found

positive eye conditions in two-thirds of fifty early cases of syphilis in which the fluid was positive.

POYNTER and ALLEN (58, **Lens antigen as a factor in congenital and hereditary eye anomalies**) were unable to corroborate some experiments which produced congenital anomalies of the crystalline lens by lens antigen. In the light of negative results there was hardly justification for the assumption that lens antibodies, which produce no observable effects on the eyes of the sensitized pregnant rabbit and rat, enter the fetus, not only to exert a lytic influence on its well developed eye, but on the determiners of the germ plasm as well.

ALLING.

GALLENGA (50, **Removal of the lens in the treatment of congenital hydrophthalmos**) reports three cases. His idea is that as the accommodative action of the ciliary muscle governs the circulation in the ciliary body and so the production of intraocular fluid, he can do away with these factors by the removal of the lens. His three cases were of monocular hydrophthalmos. The results were a disappearance of inflammatory symptoms, a marked diminution in the size of the globe, and a certain degree of rather poor vision.

GRAVES (52, **The visible beam in the aqueous**) describes the proper technique of passing a beam of light through the aqueous which can be seen in normal conditions. Its visibility is increased in various pathological conditions. The variability of this warrants the author from making definite statements of its pathological significance. ALLING.

HADEN (53, **Development of lamina cribrosa**) studied histologically sections from the human fetus. He found that the primary framework of the optic nerve is derived from the ectoderm. Later a few capillaries arising within the anlage of the pial sheath pass through the covering of the glial cells of the nerve and enter it. Fibroblasts, accompany this invasion of mesodermal tissue and later develop fibrils, which form delicate webs about the capillaries. As this fibrous tissue increases, it envelopes the glial cells and processes which form the glial septa. The lamina cribrosa is primarily glial (ectodermal), and in the later months of fetal life the posterior layers show the presence of connective (mesodermal) tissue. This mesodermal tissue is not a growth forward of the

fibrous septa, of the optic nerve but is a direct inward growth of the collagenous fibers of the anterior layers of the sclera. The anterior layers of the lamina are purely glial and remain so in adult life. ALLING.

KNIGHT (54, **Melanotic neoplasms of the eye**) concludes from her study of several cases and from a survey of the more recent contributions that tumors capable of producing pigment have an ectodermal origin and should be called melano-epitheliomata. The chromophores of the choroid do not have this power and therefore are not the anlage of the melanotic neoplasms of the globe. She believes that the obvious place for them to arise is in the pigmented epithelium of the retina. Melanin is a product of well differentiated cells, and therefore, is not produced by rapidly growing cells which accounts for the lack of it in rapidly growing tumors of the eye.

ALLING.

LAWRIE (55 **Microphthalmia with vertical, slit-like pupil, an opacity of the cornea, and remains of pupillary membrane**) describes a case of this nature in a few words. Only one eye was affected, the other was normal. The pupil dilated freely under the influence of homatropine and became round. Nothing was said about the condition of the fundus. With the proper correction the vision of the eye was $\frac{6}{4}+$.

REGANATI (59, **Two cases of faulty development of the lacrimal passages**) found in one patient a minute opening between the caruncle and the inner canthus which communicated directly with the lacrimal sac. There was no epiphora. In another patient a prolonged treatment with probes gave an opportunity to discover that the bony wall of the posterior nasal portion of the nasolacrimal duct was absent. In place of it was a yielding membrane, which permitted a probe to be moved about freely. A nail-shaped style slipped into the cavity and was later located by the X-rays in the middle meatus of the nose. From there it slipped spontaneously into the pharynx during the night and was probably swallowed.

SCHEERER (61, **Vascularized congenital cataract with visible circulation and vascular connections with the ciliary body and the tunica vasculosa lentis**) describes a condition like this found in one eye of a girl 21 years old. The other eye was

normal. The cataractous eye was slightly microphthalmic, the iris somewhat atrophic and blended with the remains of the persistent pupillary membrane. In the region of the lens were several vessels with flowing blood. Nothing could be determined as to whence they came or where they were going because of the opacity of the lens, but any connection with the iris or pupillary membrane could be excluded. Scheerer thinks they came from either the hyaloid artery or the ciliary body, which perhaps was colobomatous, as suggested by the faulty light perception and lack of projection to the author.

DERKAC (48, **Bilateral congenital microphthalmos with cyst of orbit**) found the eyeballs missing in an infant three weeks old. Beneath the skin of the lower lid were movable, palpable, fluctuating cysts, localized in the anterior part of the orbit. The right cyst is the size of a pigeon egg, the left one is somewhat larger. The contents of the cysts were yellowish liquid with 16.31% albumin in it. No histological study was made of this tissue. ALLING.

WEYMAN (62, **Microphthalmos with cyst formation**) describes a case in which the cyst was not in the usual line of closure of the fetal cleft, but an ectasia of all the layers of the eyeball except the ganglionic layer. ALLING.

VON ROETTH (60, **Novatropin in ophthalmology**) says novatropin in a two to three per cent. solution dilates the pupil more certainly and quickly than homatropine. The accommodation is completely paralyzed in from twenty-five to forty-five minutes. Homatropine acts completely in forty-five minutes in only half the cases. Novatropin is claimed to be thirty times less poisonous than homatropine. Its effect disappears at the end of twenty-four hours.

(*To be continued.*)

VI.—**Le Cancer de l'Appareil Visuel (Cancer of the Eye)**, by Dr. V. Morax, Ophthalmic Surgeon to the Lariboisière Hospital, Paris. 508 pages, 139 figures in the text and 4 plates in color. Publishers, G. Doin & Cie., 8 Place de l'Odéon, Paris, 1926. Price 100 francs.

The term cancer is used by the author in this book to indicate an invading and hence malignant growth. The tumors to be studied are, therefore, epitheliomas, sarcomas and gliomas, as they occur successively in the various parts of the eye and orbit.

The book is divided into eight chapters and treats of the cancers of the lids, conjunctiva and cornea, semilunar fold and caruncle, lacrimal apparatus, intraocular, orbital and intracranial. In each case the clinical appearance is described, together with the histological examination, explaining the difficulties of diagnosis, the prognosis and proper treatment. The bibliography of the subject is carried on to the present year from the time of the appearance of Lagrange's *Traité des Tumeurs de l'Œil*, in other words, it covers the last twenty years.

A very interesting and important feature of this book is contributed by Dr. Cl. Regaud, director of the Radium Institute in Paris, who, at the end of some of the chapters, gives the results of his unusual experience in the treatment of the particular tumor in question with radiation, and a description of the technic employed.

Dr. Morax has not only had an enormous clinical experience but has made important contributions to our knowledge of the pathology of ocular tumors and has devised new methods

of plastic surgery. He represents the happy and unusual combination of the clinician, the pathologist and the surgeon. The text is clear, the illustrations are adequate and the autochrome plates in color are unusually lifelike. This is a very important contribution to our knowledge of a subject whose interest always remains fresh, and is well worthy of careful study. A. K.

VII.—**Die bösartigen Geschwülste des Auges (Malignant Tumors of the Eye)**, by PROFESSOR H. SATTLER, Leipzig. 361 pages, 25 figures in the text and nine text-plates. Published by S. Hirzel, Leipzig, 1926. Price 22.50 Mk.

This is an enlargement of the Section on Tumors of the Eye in Zweifel-Payr's *Klinik der bösartigen Geschwülste*, adapted especially for oculists. As the eye tumors, like other tumors of the body, are often recognized too late it occurred to the author it would be well to investigate their earliest manifestations to facilitate their early recognition and correct treatment. The illustrations are increased in numbers and are original. Professor Sattler, in his long and active medical life, has had the advantages of unusual personal clinical and pathological experience and observation, so that this book is an important addition to our knowledge of the subject and admirably serves as a reliable and authoritative guide.

The subject is treated by taking up in turn the new growths as they affect the ocular structures, from the lids to the orbit. Each condition is carefully described, including its clinical appearance, diagnosis, course, pathology, prognosis and treatment. The illustrations, though few in number, are excellent, especially two in colors which depict the early ophthalmoscopic stage of a sarcoma of the choroid and of a glioma of the retina. The pathology of the tumors has been gone into most carefully and represents the latest interpretation in the light of our present knowledge of general pathology. Under treatment, the indications and results of radio-active measures are included. A very valuable feature of the book is the bibliography of the subject assembled in 32 pages, which, without attempting to be complete, gives the important references.

Professor Sattler is to be congratulated on the completion of this work and we are indebted to him for giving us in this permanent and accessible form the fruit of his long clinical and scientific experience and for his critical discussion of the many pathological problems which this subject offers.

A. K.

VIII.—**Pathology and Treatment of the Inflammatory Diseases of the Nasal Accessory Sinuses,** by PROFESSOR M. HAJEK, translated and edited by DR. JOSEPH D. HEITGER, Louisville, Kentucky, and DR. FRENCH K. HANSEL, St. Louis, Missouri. Fifth Edition, completely revised and enlarged; in two volumes, 702 pages; published by the C. V. Mosby Company, St. Louis, 1926; price $17.

Dr. Hajek's book on the Nasal Accessory Sinuses has so long been a classic that its appearance in English should be heralded as an event. The translation has been done by Dr. Joseph D. Heitger, and Dr. French K. Hansel, from the revised fifth German edition. The excellent illustrations are splendidly reproduced; the translating is well done and the author's terse and clear style has lost nothing. The work is printed on heavy paper and in two volumes which probably accounts for its high price. The book in German is so well known that it is not necessary to dwell again upon the author's scientific handling of his subject. It is an essential to every specialist in its field and will be of great advantage also to the oculist not only on account of the close relationship of the nose and the eye but because of Dr. Hajek's well-known critical attitude, even skepticism, to the necessity of operating on the nasal sinuses in the presence of optic neuritis, where the nasal condition seems negative.

A. K.

IX.—**Physical Therapy in Diseases of the Eye, Ear, Nose and Throat,** with chapters on some borderline affections, by DR. A. R. HOLLANDER and DR. M. H. COTTLE, Chicago, with an introduction by DR. F. J. NOVAK, Jr. 307 pages with 81 illustrations in the text. Publishers: The Macmillan Company, New York, 1926. Price $5.

Physical therapy has made such rapid advances in recent years that a book on this topic is now particularly timely. The authors believe that physical therapy has a definite place in ophthalmology and oto-rhino-laryngology, though they point out that it is not a new treatment to replace other methods but should be employed in addition to recognized surgical and medical measures. In Part One (81 pages) electro-physical agents are described under the headings of the galvanic current, high frequency currents (diathermy), the sinusoidal current, radiant heat-light, ultraviolet light and X-rays. Part Two (34 pages) is devoted to the treatment of diseases of the eye. In this chapter many diseases are enumerated in which physical therapy has been tried. Unfortunately, the descriptions are fragmentary and too brief and the indications and exact dosage are omitted, so that the value of this part of the book suffers. The remainder of the book is taken up with physical therapy in diseases of the ear, nose and mouth and certain borderline conditions, like asthma, hay fever, headache and facial paralysis.

As far as the eye is concerned physical therapy is now very much the vogue. There can be no question that it has a definite action in some conditions, though its exact value cannot be estimated without a great deal more work.

A. K.

X.—**A Bipolar Theory of Living Processes,** by GEORGE W. CRILE. Edited by AMY F. ROWLAND. 405 pages. The Macmillan Co., New York. 1926. Price $5.

The author states that the purpose of this book is "to present certain evidence and discussions based upon that evidence in support of the theory that man and animals are bipolar mechanisms and that the organism not only is driven by electricity but that it was originally created and constructed by electrical forces" (p. 213). It is his opinion that all the phenomena of life are electrical. That the "processes which distinguish the living from the non-living are due to electrical forces within the protoplasm, which endow the protoplasm with the essential qualities of irritation, assimilation and reproduction" (p. 214).

In support of this theory under the author's supervision, a

very large amount of experimental work has been done by expert technicians both in this country and in Europe. Many of these experiments have been of a high order, have covered a period of nearly thirty years, and have involved the most intricate mathematical calculations. Special mention should be made of the work of Dr. Fricke of the Department of Biophysics, Cleveland Clinic Foundation, which is scientifically accurate and authoritative, but the author's deductions from these experiments are not in accordance with many previously established facts of physiology. For this reason much more work must yet be done before this interesting theory may be seriously considered as a scientific possibility.

A. H. T.

XI.—**Contributions to Ophthalmic Science,** dedicated to DR. EDWARD JACKSON on his seventieth birthday, by his pupils and colleagues in the United States. 319 pages; published by George Banta Publishing Company, Menasha, Wis., 1926.

These contributions consist in forty papers which are copiously illustrated and cover a wide range of ophthalmic subjects. They are preceded by a foreword in which Dr. de Schweinitz gives an excellent and sympathetically worded account of the life and work of Edward Jackson. This volume was published by a committee including Drs. de Schweinitz, Duane, Feingold, Bedell, Crisp and Finnoff, of whom the last two acted as editors. The book-making is excellent, both as regards the printing and the illustrations. It is a dignified book, well adapted for the purpose for which it was designed, and reflects great credit upon the editors.

A. K.

CORRESPONDENCE.

PHACOANAPHYLACTIC ENDOPHTHALMITIS.

PÉCS, HUNGARY, June 13, 1926.

TO THE EDITOR:

On the basis of experiments and clinical observations I stated that an intraocular inflammation developing from cortical matter in the anterior chamber can scarcely be considered as an anaphylactic reaction (*Arch. of Ophth.*, March, 1926). In the May issue of the *Archives*, Verhoeff, who believes to have proven the occurrence of phacoanaphylactic endophthalmitis, subjects my work to criticism.

1. His first objection is that I gave no protocols of the animal experiments in which I traumatized the lenses of sensitized guinea pigs. I did not publish the protocols to spare space, especially as in all four animals (14, 20, 15, 10) simple traumatic cataract developed after the broad discission. Thus (11) black-white guinea pig, six months old. May 6th, 1925: Through a central linear wound of the left cornea we put 0.005g of pig's lens powder in the anterior chamber. May 15th: fine diffuse opacity in the center of the cornea, some fine corneal vessels. Anterior chamber normal, lens powder resorbed, pupil is reacting well. May 26th: broad tearing of the capsule of the right eye; in atropin mydriasis, linear wound, capsule forceps. Temperature just before the operation: 39.15° ½ hour after 38.8°, 1 hour after 39.5°, 1½ hours after 39.3° 2 hours after 39.4°. May 27th: O.D. pupil dilated, gray lens. O.S. as on May 19th. May 28th: around the linear wound cornea hazy in consequence of pressure of the tumescent lens. Iris normal, broad pupil. June 1st: O.D. white and quiet. Traumatic cataract.

Only in animal (21) plastic endophthalmitis developed as a

result of infection; culture gave numerous colonies of staphylococci. Animal (10) got infectious keratitis.

2. Eyes were not examined microscopically, because the traumatic cataract after discission developed without any intraocular irritation. The only case which ended in endophthalmitis was due to infection.

3. Tables I., II., III. contain all my experiments; I concede their number is small, but they gave uniform results.

4. Verhoeff writes: "He implies that the reactions were severe in both the sensitized and control animals." I emphasize again: only in cases where infection occurred.

5. He states "that the condition of allergy toward lens protein in human subjects may be different from the anaphylactic condition artificially produced in animals. One important difference is that the latter condition is transient, while the former seems to be permanent." First of all Verhoeff has no proof that the hypersensitiveness of the human subject toward lens protein may be permanent. But even if his supposition is right: 1st, I used guinea pigs, which in point of anaphylaxis are more sensitive than human subjects; 2d, the reinjection was given, and the capsule was removed, at a time when the hypersensitiveness, even if transient, must have been existing, *i.e.* three weeks after the first injection.

6. I agree with Verhoeff in basing the conclusions chiefly upon clinical observation and intradermal tests. Following his technique I tested 106 patients, 49 patients over 40 years, with negative results in each (a). I could not repeat his observation (b), to make the test in cases with severe intraocular reaction following injury of the lens, because in a series of 200 unselected cataract extractions we had severe inflammation in four cases only. In two cases much cortical matter was left, in both cases staphylococci were cultivated out of the removed cortical matter. One patient died of pneumonia caseosa ten weeks after the operation, practically no cortical matter was left. She had diabetes, and so probably she had a diabetic iritis which, however, healed within five weeks. The fourth patient had a heterochromic cataract (Fuchs) with fine precipitates, in this case the operative trauma turned the slight cyclitis into a severe one. All four cases healed with V. $\frac{4}{60}$ to $\frac{6}{24}$.

7. Using 0.1–0.2 instead of 0.04*cc* for the intradermal test I got in 10 out of 48 cases positive skin reactions. In two of the patients with positive reaction we performed a cataract extraction. Some cortical matter was left, uneventful recovery.

We are lucky not to be able to answer his objection (c), because we have not had to remove an eye after cataract extraction in the last two years. The skin reaction we got with the larger dose I consider as non-specific. Verhoeff asks why did not the remaining 38 cases also show this non-specific skin reaction? The skin of different individuals reacts differently to foreign proteins as it reacts differently to other compounds, as to insect bite.

8. If 8% of patients are hypersensitive to lens protein, then in 8% of all cataract cases intraocular reaction should occur, naturally I meant it as Verhoeff does, when sufficient amount of lens matter is left in the eye. In 166 unselected cases of lens injury, traumatic or operative, Macdonald and Lemoine obtained 8 cases of phacoanaphylactic endophthalmitis (No. 1 O.D., O.S., 2 O.D., O.S., 4, 5, 6, 12). Subtracting the cases (how many?) of traumatic cataract where the operator is not liable for the inflammation, one gets about 6% of phacoanaphylactic endophthalmitis. This percentage is not far from the maximally attainable 8%. Adding to this, the cases complicated or lost by infection and loss of vitreous, I find the number of complications too high in comparison with our statistics.

9. Verhoeff claims that cataractous lens matter was less effective than clear lens matter. Sanford Gifford, in convincing experiments, has shown just the contrary (*Journal A. M. A.*, Aug. 1st, 1925).

10. Römer and Gebb's experiments are convincing that there is no experimentally acquired autoanaphylaxis to lens protein. But if one could find a difference between the races regarding hereditary hypersensitiveness to lens protein, our opinions certainly would approach.

From these reasons I reaffirm my conclusion as expressed in the first sentence of this letter.

A. Rötth.

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